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United States Policy Toward Agrarian Reform in Underdeveloped Nations

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Michael F. Brewer

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the Great State University of Wisconsin Should Ever Encourage That Continual
and Fearless Sifting and Winnowing By Which Alone the Truth Can Be Found."

From Report of Board of Regents, University of Wisconsin, 1894

This magazine exists to provide an outlet for a wide variety of scholarly studies in land economics. It reflects the growing emphasis on planning for the wise use of urban and rural land to meet the needs of an expanding population. Housing, air and water use, and land reform are within its scope. It views land economics as economics in the broadest sense with particular emphasis on public action to achieve the best use of resources in the public interest.

This magazine was founded by scholars who believed that the essence of science is inquiry and that the urgent need is for methods to order data without cutting the heart out of the human phenomena which are the subject matter of the scholar. Land Economics welcomes articles which challenge such an institutional approach as well as those which support it.

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a quarterly journal of

PLANNING, HOUSING & PUBLIC UTILITIES

CONTENTS

AUGUST 1961

- United States Policy Toward Agrarian Reform in Underdeveloped Nations
J. P. Gittinger..195
- Local Government Assessment: Its Impact on Land and Water Use
Michael F. Brewer..207
- Urban Economics: An Appraisal of Progress*Richard B. Andrews*..219
- The Statistical Measurement of Urbanization and Economic Development
Leo F. Schnore..229
- The Los Angeles Metropolitan Transit Authority*Dudley F. Pegrum*..247

Reports and Comments

- The Nez Perce Dam and the Value of a Fishery ..*W. R. D. Sewell and M. E. Marts*..257
- The Dilemma of Urban Planning*Robert K. Brown*..260
- The Problem of Preserving Central Business District Values ...*Eugene Van Cleef*..264
- A Review of Landtype Classification and Mapping*Douglas S. Lacate*..271
- The Replacement Cost Concept*Walter Williams*..279

Book Reviews

- The City in History* (Lewis Mumford) *Charles S. Ascher*..283
- Industrial Estates: Tool for Industrialization* (William Bredo) ...*Frank Meissner*..284
- Western Forest Industry—An Economic Outlook*
(John A. Guthrie and George R. Armstrong).....*Thoms C. Adams*..285

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VOLUME XXXVII
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United States Policy Toward Agrarian Reform In Underdeveloped Nations

By J. P. GITTERING*

DURING THE PAST DECADE, technical and economic assistance to underdeveloped nations have become important, conscious tools of American foreign policy. Increasing concern with economic growth and observation of the role tenure changes played in postwar occupation policy have drawn attention to the improvement of land tenure systems, both as a means to increase agricultural production and to encourage greater political stability in rural areas. In those countries in which American diplomatic and economic assistance officials have lent the full weight of their position and resources to encourage agrarian reforms, important advances have been made toward creating economically viable, politically stable free societies. Hindsight suggests that more vigorous support for tenure reforms in other instances would also have been fruitful.

Over the past forty years the scope of

agrarian reform has broadened tremendously. The concept now involves a complex group of inter-related institutional adjustments designed to promote agricultural development and improve rural life. Basic among these changes is either a land transfer or a set of legal restraints limiting rent, increasing security of tenure, and usually transferring effective economic control of holdings to tenant farmers. American agrarian thought has perhaps been especially aware of the necessity to think in these broadened terms since the deeply rooted American agrarian tradition of antifeudalism and family farming attaches great importance to the value of individual initiative and to a progressive, individualized agriculture as a bulwark of political democracy.¹

The breadth of the current view of agrarian reform is illustrated by the statement of the United States representative

* Harvard Advisory Group, Plan Organization, Tehran, Iran.

¹ For a British view, see Doreen Warriner, *Land Reform and Development in the Middle East* (London, England: Royal Institute of International Affairs, 1957), p. 3.

to the Economic and Social Council. "Land reform," he told his international audience, "comprises improvement in all the social and economic institutions surrounding farm life." It includes "redistribution or consolidation of holdings . . . security of tenure . . . improvement of title . . . reform of the tax system . . . and establishment of cooperative societies for common purchase, marketing, and credit."² A council resolution, subsequently endorsed by the United Nations General Assembly, mentions sixteen different areas of emphasis as "appropriate measures of land reform."³

But there is a temptation in administering foreign aid policy to dodge the difficult political problems of tenure change and hide behind a program limited to the support of services. As a prominent Middle Eastern specialist put it: "This large conception of land reform does not give sufficient emphasis to the basic issue of the land tenure system. . . . At the heart of the problem of land reform in underdeveloped countries is the question of who owns the land. This fundamental question has been confused and overshadowed by the attention paid to other factors . . . which, although undoubtedly related to the main problem, are not more than a manifestation of this, the basic malady of the agrarian structure."⁴

Worldwide Policy

From the beginning of the United States' effort to help underdeveloped

countries increase their rates of economic growth it has been recognized that agrarian reforms must play a prominent role. But in 1950, when Poland introduced a draft resolution on agrarian reform at the United Nations General Assembly, it suddenly became urgent to clearly enunciate official American policy. The resolution called for an investigation of the "agrarian structure of economically backward nations" and called upon the Economic and Social Council to prepare recommendations "with a view to the improvement of the conditions of small and middle peasants." "Tactically," as one observer noted, "it was a brilliant move. Not only did it bring to the forefront a problem dear to the hearts of multitudes in the underdeveloped countries . . . but it established the Soviet bloc as the leader in the drive for agrarian reform."⁵

The Americans were quick to recognize the challenge and immediately offered amendments favoring family-sized holdings, rural cooperatives, and small-scale indigenous private enterprises. They also suggested bringing in the Food and Agriculture Organization, (hereinafter referred to as FAO) a proposal the Soviet Union resisted since it was not an FAO member. In the end the Assembly unanimously adopted two resolutions encompassing the Polish draft and most of the suggested amendments.⁶ The probability that the Soviet Union would try to use the issue of land reform to foment unrest in underdeveloped nations and build support for local Communists had long been recognized. Rus-

² Isador Lubin, "Land Reform Problem Challenges Free World," *The Department of State Bulletin*, September 17, 1951, pp. 467-473.

³ The text of the resolution is given in *The Department of State Bulletin*, September 17, 1951, pp. 473-475.

⁴ George Haim, "Land Tenure Reform," *Middle East Economic Papers* (Beirut, Lebanon: American University of Beirut, 1954), quoted in Warriner, *op. cit.*, p. 6.

⁵ Leo M. Egand, "The Question of Land Reform in the United Nations, 1950-54: The Ideological Basis of the Position Taken by the Soviet Bloc," *The American Journal of Economics and Sociology*, October 1956, pp. 43-53.

⁶ United Nations General Assembly, Economic and Financial Committee, Fifth Session, *Official Records*, p. 116.

sian opposition to the Japanese land reform and the support the Chinese Communists had gained from their espousal of agrarian reform were only too obvious signs.

Increasing recognition that agrarian reforms needed an explicit treatment in American policy led the President of the United States to appoint the Inter-Agency Committee on Land Reform Problems early in 1951. The Committee soon circulated a policy statement officially declaring agrarian reforms an "important part of United States foreign policy." In somewhat platitudinous style the memorandum set forth American willingness "to encourage and assist desirable land reform measures" through "all appropriate international agencies." Although it was not mentioned in the memorandum, a clear understanding existed that United States funds could in no instance be used to finance redistribution of land, even on a loan basis. Unfortunately, the Committee, off to a good start, was never reconvened following the change of administration in the spring of 1953.

In October 1950 President Truman had given dramatic recognition to American attitudes toward land reform. Returning from his historic Wake Island conference with General Douglas MacArthur, the President said: "We know that the people of Asia have problems of social injustice to solve. . . . They want their farmers to own their own land and to enjoy the fruits of their toil. That is one of our great national principles, also . . . this is the basis of our agriculture, and has strongly influenced our form of government."

By early 1952 the American viewpoint had crystallized to the point that Secre-

tary of State Dean Acheson, speaking at the new FAO headquarters in Rome, stated unequivocally—if with some exaggeration—that "land reform is absolutely foremost in our whole international policy."⁸

Support for FAO Tenure Program

One expression of United States concern about agrarian reform has been the official support accorded FAO efforts. This support has the advantage of making American interest evident without ever having to face up to the difficult question of whether to use United States influence to push forward a situation where little progress toward effective agrarian reform is being made.

Early planning for FAO—much of it under active American sponsorship—had included explicit provision for work on land tenure.⁹ But in the immediate post-war world pressing problems of food shortages preoccupied that organization. Then, as the general food situation began to improve, the 1950 General Assembly resolution again turned attention to agrarian reform. At the Twelfth FAO Council session in 1951 the United States government promised American encouragement to land reforms in international bodies and in its foreign aid program. Six months later, at the Sixth FAO Conference in December 1951, the United States delegate declared that "the greatest objective of FAO cannot be achieved unless a high percentage of the world's farmers . . . own their own land."¹⁰ In 1953 the United States supported a resolution requesting FAO to give "high priority" to providing technicians, conduct-

⁸ *The Department of State Bulletin*, February 11, 1952, p. 202.

⁹ Gove Hambridge, *The Story of FAO* (New York, New York: Van Nostrand, 1955), p. 49.

¹⁰ *The Department of State Bulletin*, December 17, 1951, p. 999.

¹ *The New York Times*, October 18, 1950.

ing seminars, and gathering information on agrarian reforms,¹¹ and instructed its delegate to urge FAO to be "less hesitant in its approach to specific program activities" in implementing the General Assembly resolution.¹²

Since 1953, FAO has been active in the field of land tenure. It has organized regional conferences in Latin America, the Far East, and the Near East to discuss land tenure problems, and in Ceylon to discuss land settlement. FAO specialists have worked in more than sixteen countries. It has published a series of publications on land tenure problems. Both private American citizens and government officials have participated in these FAO activities. But the initiative has remained with the host governments or with private Americans, since, by the very nature of an agency like FAO, opportunities for official American policy initiative in particular nations must remain extremely limited.

Agrarian Reform Policy in Foreign Aid

The real test of United States policy toward agrarian reform must be evidenced in American diplomatic activity and in the administration of bilateral foreign aid. Here the record has been spotty. Much has depended upon personalities and upon short-run concerns of military posture and internal stability. Yet, if there remain some questions about how "absolute foremost" land reform has been over the past decade, and especially since 1955, there can be little

doubt that American assistance and positive United States leadership have been very important in several instances. Unfortunately, there are equally cases where a more vigorous policy toward tenure changes might have helped avert serious situations while at the same time enhance the effectiveness of over-all American diplomatic efforts.

For Americans concerned with formulating and implementing diplomatic and foreign aid policy the approach toward land tenure changes has posed thorny problems of principle. There is the question of interference in the internal affairs of another sovereign people. There is the problem of the effect on agricultural production. An instinctive conservatism generally appropriate in the American setting of a dynamic economy colors the attitudes of officials dealing with foreign land ownership problems. Many have serious reservations about any program which compulsorily transfers property rights. It may be possible to stave off a developing situation by short-run policies not involving major tenure changes while vigorous action may cause active resentment among those who do hold power and can jeopardize other American policy objectives. So, even though they may recognize the importance of land ownership for agricultural development and long-run political stability, there has been a tendency during the past decade for policy-makers to dodge the difficult implications of pushing tenure change. Cannot we concentrate, instead, on improved seed or agricultural extension as means to lift rural levels of living?

Faced with such a quandary a knowledge of the results of past United States policy toward agrarian reform is useful. The lessons of Japan and mainland China are of restricted interest in this connection since both grew out of war-

¹¹ Seventh Session of the FAO Conference, Resolution No. 31/1953.

¹² Letter from Assistant Secretary of State Thurston B. Morton to Senator Hubert Humphrey, dated January 18, 1955.

time situations. Three Asian countries furnish more interesting case studies for peacetime foreign aid policy: the Philippines, Taiwan, and Viet Nam.

The Philippines: an Opportunity Lost. The earliest substantial support for agrarian reform as part of the Point-IV concept came in the Philippines. There, initial, vigorous American support for major land tenure changes has successfully eroded away into a more timid policy with a resulting failure to solve the serious problems of large landholdings, poor tenant farmers, and low agricultural productivity.¹³

In October 1950 a survey group, now generally called the Bell Mission, submitted to President Truman a group of recommendations for technical and economic assistance designed to stem deteriorating economic and social conditions in the Philippines. The Mission noted the declining proportion of owner-operators, concentration of land ownership, ineffective legal protection for the cultivators, and the plight of the Philippine tenant "caught between two grindstones"—a landlord "who often extracts an unjust share of the crop," and the "deplorably low productivity of the land." The Mission proposed a widespread land redistribution and stern tenure security measures. United States assistance was to be "conditioned" upon action to carry out the reforms, including land tenure changes, which the Mission recom-

mended.¹⁴ The two governments took the Bell Mission Report as "a practical and sound point of departure"¹⁵ for a technical and economic assistance program in which the use of American funds "by design . . . gave priority to . . . agrarian reform."¹⁶

To develop a basis for framing the agrarian reform the American aid mission brought to the Philippines an American land tenure specialist, Robert S. Hardie, who had worked on the land reform during the occupation of Japan. Hardie found that "the land tenure system stands as an obstacle thwarting all efforts of the United States to foster the development of a stable and democratic economy" and recommended a sweeping tenure change "to abolish, insofar as practicable, the institution of tenancy in Philippine agriculture" and to "establish fair tenancy practices for . . . farmers who continue to work the land as tenants." He suggested American aid totalling \$25 million to help administer the program.¹⁷

Hardie's report became the subject of heated debate in the United States aid mission. Hardie himself stoutly defended his report, resisting changes he felt would reduce its effectiveness. In this he was supported by Ambassador Raymond Spruance who leaked the report to the press in December 1952, setting off a spirited public reaction.¹⁸ Filipinos ap-

¹³ A discussion of the tenure policies of the United States in the Philippines can be found in, David Wurfel, "Foreign Aid and Social Reform in Economic Development, A Case Study," *The American Political Science Review*, June 1959, pp. 456-482. The following paragraphs rely heavily on this source.

¹⁴ Daniel W. Bell, et al., *Report to the President of the United States by the Economic Survey Mission to the Philippines*, Washington, D. C., October 9, 1950, p. 55 ff.

¹⁵ Memorandum of Agreement signed by President Elpidio Quirino in behalf of the Philippine Government and ECA Administrator William C. Foster, representing Harry S. Truman, President of the United States, November 14, 1950, quoted in, Robert S. Hardie, *Philippine Land Tenure Reform—Analysis and Recommendations* (Manila, Philippines: Special Technical and Economic Mission, Mutual Security Agency, 1952), p. FI.

¹⁶ James P. Emerson, *Land Reform Progress in the Philippines, 1951-1955* (Manila, Philippines: International Cooperation Administration, 1956), p. 4.

¹⁷ Hardie, *op. cit.*, pp. 25 and 15.

¹⁸ Wurfel, *op. cit.*, p. 472.

peared to take particular umbrage at Hardie's assertion that "unless corrected, it is easy to conceive of the situation worsening to a point where the United States would be forced to take direct, expensive, and arbitrary steps to insure against the loss of the Philippines to the Communist block (sic) in Asia . . ." ¹⁹ By leaking the report Ambassador Spruance effectively increased public understanding of the tenure problem and helped pave the way for Ramon Magsaysay to make rural development a major issue in his successful 1953 campaign for president.

President Magsaysay in his inaugural address promised an agrarian reform to include expanded land settlement, land transfer, taxes to encourage full land utilization, title settlement, better tenure regulation, and improved credit facilities—all moving toward the country's "ultimate goal" of a "strong nation of small, independent and contented farm owners." ²⁰ By the end of 1955 he had secured legislation for all but his land tax proposal—although much of the legislation, especially that governing land transfer, was not as sweeping as the measures recommended by Hardie and the Bell Mission. Americans in the technical assistance mission actively cooperated in framing the details of the tenure policy and in drafting legislation.

Unfortunately, just as Philippine conditions were becoming more favorable for the forthright support of effective agrarian reform a marked note of caution crept into official American policy. In particular, the aid mission, with Washington approval, stopped short of the key measure—land transfer. In contrast to Hardie's bold recommendation to "elim-

inate" tenancy, the new policy circumspectly supported transfer only when it would make a "substantial contribution toward eliminating existing difficulties"—presumably overt social unrest—or when "landlords fail to comply with landlord-tenant laws" ²¹—a generally ineffective practical policy.

Following the untimely death of President Magsaysay the drive for agrarian reform largely evaporated. The new Philippine administration reflected much greater landlord influence. American aid policy in the Philippines quickly shifted away from pushing the thorny issue of transfer and concentrated on the less controversial program of increased productivity and improving the credit system. As a result, even official American advisors note a general failure to improve tenure conditions. Among the "unsolved land reform problems," as one official working in the Philippines saw them in 1958, were the failure in practice to increase the tenant's share of the crop, the existence of middlemen in the share tenancy system, the continuing lack of credit facilities, the failure of tenants to press for their rights, a relatively slow rate of land settlement, and the breakdown of the land transfer program due in large measure to "a great deal of political interference." But instead of suggesting a vigorous policy in support of the "ideal way to correct the share tenancy system" through a widespread land transfer, he recommended only more of the same program which had left unsolved his land reform problems—better farmer education and making available better production techniques. ²²

¹⁹ Hardie, *op. cit.*, p. 8.

²⁰ Quoted in Emerson, *op. cit.*, p. 14 f.

²¹ Frate Bull, *Philippine Land Reform, 1950-1958* (Manila, Philippines: International Cooperation Administration, 1958), p. 22.

²² *Ibid.*, p. 33 ff.

Today, a decade after the Bell Mission recommended urgent action to rescue the Philippine tenant from "between two grindstones," little effective agrarian reform has been realized and a substantial opportunity for vigorous United States initiative to support the establishment of family farmers in a free society has been lost. Recent press reports of rural discontent and resurgent Huk activities may point to the future costs this irresolution will entail.

Taiwan: Success Following Failure. How effective timely American urging and assistance can be in furthering tenure improvement is well illustrated in the case of Taiwan where the Chinese-American Joint Commission on Rural Reconstruction (JCRR) contributed in large measure to effective agrarian reform. The example is all the more interesting in the light of the earlier failure of the Chinese Nationalists to resolve tenure problems on the mainland and the support the Communists gained from advocating land reform.

The JCRR was formed in October 1948 and immediately embarked on an eleventh-hour effort to stabilize rural conditions on the mainland, using funds from the China Aid Act of 1948. The commissioners included three Chinese of national stature and two Americans, both with years of experience in China. The Commission attached high priority to tenure improvement and called for an "end to piecemeal efforts" and a "vigorous and determined effort" to improve rural conditions with priority attached to land rent reduction and tenure security.²³ Its programs in Fukien and Szech-

wan provinces in 1949 had begun to make substantial headway before Communist advances forced it to abandon its work. As the chief American commissioner, Raymond T. Moyer, lamented, "it was too late—too late to realize . . . the full accomplishment of what might have been possible had the program been started two or three years earlier."²⁴

The tenure lesson was well learned and one of the earliest measures undertaken by the Nationalist government when it began to think of Taiwan as a place of refuge was the so-called 37.5 percent rent reduction program, a measure having roots stretching back to Sun Yat-sen but applied effectively only after 1949. The JCRR was instrumental in urging the program and later in helping devise administrative procedures and financing implementation.

It was obvious that tenure improvement could not stop short of land transfer; and the JCRR from the first deliberately pressed for a three-step process going beyond rent reduction to the sale of government-owned land and culminating in the "land-to-the-tiller" program to transfer private land.²⁵ During 1952 the JCRR assisted in drafting transfer legislation, helped reorganize rural tenure administration, and undertook a landownership classification survey. The first transfers began in February 1953 and were completed a year later. By the end of the program the proportion of tenanted land had fallen from 38.6 percent to 15.2 percent. With a measure of understatement two Chinese who played important roles in the program noted: "Rarely has it happened in

²³ *The Program of the Joint Commission on Rural Reconstruction* (Washington, D. C.; Economic Cooperation Administration, undated), p. 13.

²⁴ *Ibid.*, p. 29.

²⁵ W. H. Fippin, private communication, February 4, 1961.

Chinese history that a program of socioeconomic reform was executed and carried out in so short a period and in so speedy a manner."²⁶

That rent reduction and later the land-to-the-tiller program contributed substantially to improved levels of rural living and to greater production is hardly open to doubt. Following rent reduction the average increase in annual tenant income amounted to some 100 kilograms of rice per person. Hog numbers rose 32 percent on tenant farms as compared to 7 percent on owner-operator farms. Tenants frequently joked about "37.5 percent houses, 37.5 percent buffaloes, 37.5 percent weddings, and 37.5 percent funerals."²⁷ The land transfer contributed to a continuation of this improvement. Paddy production rose from 1,058,000 metric tons in 1948 to 1,839,000 tons in 1957—not all due, by any means, to land reform but in large measure facilitated by the improved productive environment and greater economic incentives. In real terms farmer incomes from one chia (.97 hectares) of medium-grade rice-land rose from 2,092 kilograms in 1948 to 5,272 kilograms by 1957. Surveys show that, of the increased income, two thirds is being reinvested in the farm enterprise. Other, less tangible benefits have come, too. Farmers organizations are much more active, and rural school enrollment—already high for Asia—rose from 77 percent of the school-age children in 1948 to 98 percent in 1957.²⁸

²⁶ Hui-Sun Tang and Jen-Lung Chen, "Land-to-the-Tiller Policy and Its Implementation in Formosa," *Land Economics*, August 1955, pp. 196-203.

²⁷ Robert B. Moody, "Land Reform in Taiwan," in Howard M. Teaf, Jr. and Peter G. Franck, eds., *Hands Across Frontiers* (Ithaca, New York: Cornell University Press, 1955), pp. 128-181.

²⁸ *Land Reform in Taiwan* (Taipei, Taiwan: Land Bureau, Department of Civil Affairs, Taiwan Provincial Government, 1958), p. 16 ff.

Rural unrest has been virtually eliminated.

American support played a critical part in the initiation and success of the agrarian reform. The device of the JCRR permitted Americans to press their viewpoints effectively and at the same time provided an excellent base from which the respected Chinese commissioners could be much more effective. Dr. Moyer, as chief American commissioner and concurrently Director of the Economic Cooperation Administration mission, was willing to exert the full force of his position and aid funds as a lever for effective tenure improvement. In all, American assistance amounting to just under \$2 million was allocated to tenure improvement from mid-1949 to early 1954.²⁹ These funds financed personnel training, helped carry out a critical reorganization and election of local land commissions, subsidized salary payments, made possible the essential pretransfer land-ownership classification, and purchased surveying equipment. By their judicious use of aid and consultants and their willingness to press steadily for tenure improvement the Americans on Taiwan made a major contribution to the realization of United States policy objectives.

Viet Nam: Struggle for Peasant Loyalty. In South Viet Nam continued American support for extensive tenure improvements has been critical in realizing a rent reduction and tenure security program and a land transfer, which together affect about three-fourths of the peasant farmers. Although these agrarian reforms have far from resolved problems

²⁹ W. H. Fippin, *Summary Report of Accomplishments of JCRR-Supported Activities on Taiwan* (Taipei, Taiwan: FAO Mutual Security Mission to China, 1954), p. 3.

of rural insecurity, they have been among the most important and effective measures carried out by the government in the countryside.³⁰

Deteriorating rural conditions and rapidly falling market rice production were already paramount problems when the Economic Cooperation Administration first established its aid mission in 1951. From the start, American agricultural specialists pointed out that little permanent reduction of rural insecurity could be expected without real tenure improvement. But French influence and that of Vietnamese "indigenous colonialists" blocked all but a few token measures designed primarily as propaganda measures. This standpat attitude continued throughout 1952 as the Communist Viet Minh continued to extend its area of control. Early in 1953 the Vietnamese government finally passed four agrarian reform ordinances—but it was clear they were not intended for anything more than propaganda if only because the government deliberately failed to include any provisions for enforcement or penalties for violators. A *New York Times* correspondent at this time commented in private conversation that he found less enthusiasm for agrarian reform in Viet Nam than in any other Far Eastern nation.

When the Ngo Dinh Diem government came to power following the Gen-

eva accord of July 1954 the American aid mission cabled Washington that "an honest land reform, intelligently and aggressively applied, may offer one of the best means for meeting the (Communist) challenge." But the new government disappointingly outlined a cautious tenure program turning on land settlement and long-term loans to finance private transactions. Under the circumstances American officials characterized the program as too conservative and "completely unacceptable in its present form."

It was the immense task of absorbing and resettling refugees from North Viet Nam that finally gave the Americans the lever for which they had been searching. Premier Diem's personal appeal to President Eisenhower embroiled the Americans in "Operation Exodus" which in a few months dumped some 800,000 refugees on a Saigon wharf. When General J. Lawton Collins arrived on the scene in November 1954 as President Eisenhower's personal representative, he had been instructed to include effective agrarian reform as a condition of the increased aid the Diem government had so urgently requested. A joint presentation carefully coordinated with the French urged the Vietnamese to undertake immediately recultivation of some 800,000 hectares of land lying abandoned as a result of rural insecurity (resettling refugees on much of it), a tenure security and rent reduction program, and studies leading to a "land redistribution which will enable tenants to acquire small holdings."

Premier Diem, faced by this combined representation, was convinced. Months of spadework among Vietnamese, American, and French agricultural technicians paid off and within three weeks Diem was able to promulgate the first of two tenure ordinances. These limited rents

³⁰ A description of the Vietnamese land tenure program may be found in, J. P. Gittinger, "Progress in South Vietnam's Agrarian Reform," I and II, *Far Eastern Survey*, January and February 1960, pp. 1-5 and 17-21. Information in the section which follows is based on the files of the United States Operations Mission to Viet Nam or upon the author's direct observation.

An analysis of the American relationship to the Vietnamese agrarian reform is included in, John D. Montgomery, *The Politics of Foreign Aid: An Analysis Based on the American Experience in Southeastern Asia*, to be published under the auspices of the Council on Foreign Relations.

to no more than 25 percent of the gross yield, guaranteed cultivators security of tenure for at least 5 years and extended an initial rent-free period and subsequent security of tenure to any peasant recultivating abandoned land. No land transfer was included. Implementation of the tenure security and rent reduction program proved disappointingly slow despite financial assistance and repeated urgings on the part of the Americans and it was over a year before any real progress was noted. Even then, enforcement was lax and relations between the American mission and the Ministry of Agrarian Reform became so strained at one point that the Americans very nearly cut off their budgetary support.

Although major American tenure policy emphasis in 1955 and early 1956 turned from land transfer to refugee resettlement there continued a body of opinion both in Washington and Saigon favoring land transfer. In the summer of 1955 Washington by cable urged the whole question be re-examined with a view to pressing extensive transfer. The mission replied that "land distribution as a major political weapon cannot be exercised now." But pressure continued to be applied by official Americans and over the course of the next year Diem, now become president, increasingly recognized transfer would be necessary. In October 1956, following several working-level conferences between American agricultural specialists and their Vietnamese counterparts, he promulgated an ordinance under which 700,000 hectares belonging to nearly 2,500 owners will be transferred to some 300,000 peasant cultivators. The program is scheduled to be complete by the end of 1961.

American support for both tenure security and land transfer included not only technical assistance but budgetary

support, together amounting to just over \$4.1 million from 1955 through mid-1960. Conforming to established American policy the mission carefully avoided use of United States money for land purchase but it did agree to increase a highway program by \$3 million with the understanding that funds released by the Vietnamese government would finance down payments to landowners.

Although there have been some serious problems associated with the administration of agrarian reform it would appear that on the whole it has met with a substantial measure of success, notwithstanding recently increased problems of rural insecurity.³¹ Communist propaganda has had generally limited success in discrediting the tenure reforms and most peasants seem pleased with both the tenure security and the land transfer programs.

The Direction of United States Policy

There have been many other countries over the past decade where American policy has had to deal either overtly or by default with pressing land tenure problems and where new policy decisions must now be formulated.

United States policy toward agrarian reform in underdeveloped nations has been shown to have realized a substantial measure of success in furthering stable, viable societies where it has actively supported tenure improvement. This has been the case both in urging effective reforms where friendly governments are

³¹ See, for example, Tillman Durdin, "Vietnam Extends Agrarian Reform," *The New York Times*, April 2, 1959; Ernest K. Lindley, "An Ally Worth Having," *Newsweek*, June 25, 1959; and Arnold Beichman, "Land Reforms Stir Viet Nam," *Christian Science Monitor*, October 22, 1959. A less optimistic opinion is expressed in, Dennis Bloodworth, "Diem Shielded from Corruption in Nation," *New York Herald Tribune* (European Edition), September 1, 1960.

hesitant and in lending technical and economic assistance for implementation.

But equally so the United States has missed some opportunities where a more vigorous policy could have contributed to a somewhat different evolution of events. It is fallacious, of course, to imply that the single change in policy toward agrarian reform would necessarily have altered the course of affairs. It is not too much to suggest, however, that the kind of policy which would have included greater support for tenure improvement might well have been more effective.

American policy makers, it would appear, would do well to give sympathetic consideration and support to those elements within a nation which would like to effect genuine agrarian reforms. A clear assessment of the imperatives of such a policy must be made and the courage found to follow through on their implications, even at the cost of short-run problems. Myopic views of military posture or internal security must not be allowed to obscure long-run United States and Free World objectives. Administrators in Washington must be willing to back up their field representatives and ambassadors must accept agrarian reform

as a major American policy objective. Many devices are open for imaginative use: counterpart funds or development loans to finance land purchase; P. L. 480 food to tide over any temporary fall in marketings;³² selective budgetary and technical assistance. The United States must be willing to extend its support and leadership in international agencies as well as the facilities of its universities and technicians.

Americans bear a heavy responsibility to the peoples of underdeveloped nations to use the influence and resources of the nation to help initiate and finance major land tenure changes which can contribute to increased production and better rural living. Such a policy may help avoid unfortunate situations such as have arisen in the past and it can be a major contribution toward helping underdeveloped nations realize their aspirations for social and economic improvement without forcing them to resort in desperation to extreme totalitarian solutions.

³² Since this article was prepared an encouraging step has been taken in this direction. See, Felix Belair, Jr., "U.S. to Offer Feed Grains to Aid Latin Land Reform," *The New York Times*, February 10, 1961.

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Acceptance and Yield of Choice and Good Beef:

Research Results and Implications *V. James Rhodes*

Projections of Water Requirements in the

Economics of Water Policy *S. V. Ciriacy-Wantrup*

The Economics of Cooperative Ventures—

Further Comments *Raphael Trifon*

The Farm: The Misused Income Expansion Base of

Emerging Nations *Richard W. Lindholm*

Age Components of Decrease in Number of Farmers,

North Central States, 1890-1954 *Don Kanel*

Cost-Size Relationships for Cash Crop Farms in a

Highly Commercialized Agriculture *H. O. Carter and G. W. Dean*

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Local Government Assessment: Its Impact On Land And Water Use†

By MICHAEL F. BREWER*

Introduction

THE EFFECTS OF TAXATION on social activity long have been of major concern to economists, public officials, and individual citizens. Fiscal programs have been employed both as a source of governmental revenue and as positive tools for influencing private decisions. When used primarily for the former purpose, equity considerations have been given emphasis in determining the policies to be adopted for given revenue objectives. When used to influence private decisions, efficiency considerations become extremely important.¹ The impact of public taxation on private decisions has been cited as particularly significant in affecting the direction and rate of agricultural development, with recent authors stressing its relevancy for underdeveloped countries.²

The relationship between taxation by units of local government and land and water use, so especially important in arid areas, is examined in this paper. For simplification, two alternative uses of land and water are considered: dry farming

and irrigated cultivation.³ Although both types of cultivation may exist simultaneously within the same farm unit, for simplification they are considered basic production alternatives. The extent and rate of irrigated cultivation within areas of local governmental jurisdiction are analyzed as a reflection of the assessment practices adopted.

In arid regions and areas where the appropriate doctrine of water law obtains, actual use of land and water for irrigated cultivation frequently is the consequence of two separate sets of decisions.⁴ The first involves changes in an area's existing water supply potential⁵ by making an additional quantity available for use. The second set includes decisions by individual irrigators to employ that water in the cultivation of crops. Both sets jointly have been referred to as "agricultural development" or "irrigation development," but it is useful to distinguish between them. The first will be alluded to as water "development" and the sec-

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¹ Efficiency is used here as a relative measure of the net social benefits derived from alternative programs, taking into account an evaluation of aggregate changes entailed in private production decisions.

² See particularly, Haskell P. Wald, *Taxation of Agricultural Land in Underdeveloped Economies* (Cambridge, Massachusetts: Harvard University Press, 1959), p. 231.

³ These may represent highly differentiated alternatives in a physical sense, involving separate methods of land preparation, planting, cultivation, and harvesting; or the latter merely may constitute an easily executed additional step to the dry-farm production process, entailing minor additional water and labor inputs.

⁴ The term "decision" is used in a *post ipso facto* sense, implying simultaneously the action needed to achieve the objective specified by the decision.

⁵ Irrigation water application is noncontinuous over time and surface runoff varies annually. A larger supply may be designated in terms of a weighted aggregate of the physical quantity available for use in an "average irrigation season." The weights attribute higher relative importance to quantities available during periods of peak irrigation demand. Augmentation of the supply thus may be achieved by altering the timing and/or placement of water.

ond as "on-farm water use." In arid areas these two sets of decisions often are resolved by different agents.⁶

The high capital requirements of water development in arid areas and the uncertainty of future supplies induced both by physical and legal conditions have been basic factors in the wide adoption of public organizations for undertaking water development activities in such regions. Common prerogatives accorded these agencies are the sale of bonds and member assessment. Such organizations have effectively reduced the uncertainty associated with continued future water supplies as a result of the structures they have built, the legal implications of their administrative practices,⁷ and their political potential—both individually and in association.

The functioning of public water development agencies directly shapes the conditions under which on-farm water use decisions are made. These effects stem from both their legal constitution and administrative procedures. In focusing on the assessment practices of local governmental units, one such procedure is considered. To facilitate exposition the California irrigation district is considered typical of such units. Analysis of its assessment behavior, however, is applicable to a wide variety of public water agencies in the United States and elsewhere.

⁶ In the United States many federal water institutions reflect conditions of humid areas where both sets of decisions usually are made by the same agent, the individual farmer. This characteristic often involves problems when these institutions are used in arid areas and explains the prominent role of contractual arrangements in western water development between public agencies who develop and private individuals who apply this water in irrigated cultivation.

⁷ Such practices have been particularly important with respect to the fortification of water rights by diligence in use. See S. V. Ciriacy-Wantrup, "Criteria for a System of Water Rights," *Land Economics*, November 1956, pp. 295-312.

The composition of public water district assessment and methods of application are presented in the following section. Its economic impact on land and water use within the district is analyzed in Section II. The assessment is then evaluated in terms of selected criteria in Section III, and conclusions are presented in the final section.

Public Water District Assessment

The public water district is a unit of local government administered by an elected board of directors designed to make available water for agricultural use. Such districts have been formed to engage in new water development, to acquire existing irrigation works, and to provide supplementary irrigation for areas already partially served by other sources. The abundance of this type of local community organization in the western United States, and its contrast to organizations in many countries where the central government is the principal or sole agency responsible for these activities, has been noted.⁸

The assessment is an integral part of the "pricing" device of public water districts which also includes a charge per unit used, or water toll. These two components jointly determine the payment members make to their district. Assessments are levied annually on privately owned land within the district. The water toll is incident only upon members using water supplied them by the district. Customarily the toll is defined in terms of a volume unit, such as an acre-foot, although occasionally it is based on the

⁸ See Frank Adams, *Community Organization for Irrigation in the United States* (Rome, Italy: Food and Agriculture Organization of the United Nations, October 1952), 76p.

area irrigated with district water.⁹ The entire payment incident upon a member for a given amount of water may change either in terms of its total magnitude or the proportion that the toll and assessment components bear to each other. Although emphasis is placed on the district assessment, it cannot be considered relevantly in isolation from the water toll.

It is helpful to view assessments as a process entailing a number of definitions and decisions. These jointly constitute a structure—which includes the assessment base, the area subject to assessment, a valuation procedure, and a rate of levy applied to the base as valued for assessment purposes. Although each element in the assessment structure is determined by a district's directors, legislation and administrative practice have rendered certain ones more susceptible to change than others.¹⁰

The assessment base generally is defined as all real property within the district. For the California irrigation district such wording in its organic act¹¹ has been specified further in subsequent legislation defining land exclusive of improvements as the assessment base.¹² All

private land is subject to a district assessment regardless of the use to which it is put. This is in keeping with the area of benefit criterion used to establish district boundaries.¹³

Procedures for valuing this unimproved property base differ widely between districts and within individual districts over time, despite the legal stipulation that assessments shall be levied upon the unimproved land valued at its current full cash value.¹⁴ Frequently-used valuation procedures include the following: (1) a single value per acre, obtaining to all land assessed within the district, (2) a set of per-acre values, applied according to land and water use, (3) a set of per-acre values that are relative to the cost incurred by the district for supplying a particular land parcel, and (4) a set of per-acre values applied according to the relative soil characteristics of particular parcels.

Older valuation practices generally used either a flat value rate for all land or some fraction of the value assigned for county tax purposes. Many districts have modified these early methods to make allowances for land of different agricultural potential,¹⁵ especially in those that have entered into contract with the federal

⁹ The most usual practice is to specify a seasonal charge for each acre irrigated from the district supply. This may be the same for all crops but most commonly varies in rough proportion to the relative amount of water applied to each irrigated crop. See Michael F. Brewer, *Water Pricing and Allocation with Particular Reference to California Irrigation Districts*, California Agricultural Experiment Station Report No. 235 (Berkeley, California: 1960).

¹⁰ The average coefficient of variation ($\frac{\sigma^2}{\bar{x}} \cdot 100$) for ten randomly selected California irrigation districts over the period 1940–1955 was as follows: acres assessed, 2.53; average valuation per acre assessed, 11.42; total rate of levy, 27.02. *Ibid.*, p. 71.

¹¹ California Laws, Statutes, *Statutes of California: 1887* (Sacramento, 1887), pp. 29–45.

¹² In 1907 improvements were defined to include: "trees, vines, alfalfa, growing crops, and all buildings and structures of whatever class or description erected or being erected on said lands or town lots." California Laws, *op. cit.*, 1909, pp. 461–462.

¹³ Initially, this criterion was applied in terms of surface water exclusively. See California Laws, *op. cit.*, 1891, pp. 142–147. Later, as pumping ground water became a widely adopted practice and surface-ground water inter-relationships were receiving study and measurement, this concept was broadened to include benefits from ground water conditions resulting from the activities of the district. See California Laws, *op. cit.*, 1913, p. 782.

¹⁴ See California Water Code, Sections 25500–25559.

¹⁵ Allowance has been made for factors affecting the net returns from the agricultural use of individual land parcels. As brought out below, these modifications commonly have employed soil characteristics criteria. As discussed in Section III, this shift in valuation procedures appears to have followed rapid expansion of irrigated acreage characterized by the initial accrual of secondary benefits to district members.

government.¹⁶ The rate of assessment levy is expressed in terms of dollars assessed per \$100 of the property base value. In some districts the total rate is divided into components, each of which may be assigned to specific district funds.

With the assessment base specified, the area subject to assessment delineated and valued, the application of a given rate of levy produces a certain assessment receipt. Conversely, if a required assessment revenue is specified, the rate of levy may be easily calculated. Early California irrigation district legislation required bond principal and interest payments to be met from assessment receipts¹⁷ with the associated water toll calculated to generate the complement of the budgeted district outlay for the ensuing fiscal year. Subsequent relaxation of this requirement is evident in legislation¹⁸ and actual district practices.

The Economic Impact on Land and Water Use

Accepting maximum net return as the criterion for private production decisions, the pattern of land and water use within a district may be viewed as the result of members adapting to their immediate economic environment.

Economic theory demonstrates that this maximum obtains under the well-known equi-marginal conditions. If the ratio of factor costs varies and factor substitution is technically possible, least-cost production requires substitution of the relatively "cheaper" factors for the more dear ones. If all inputs are perfectly divisible, actual change is expected. If indivisibilities prevail, this may not be reflected empirically.¹⁹

The impact of a district assessment on the agricultural use of land and water may be considered from two levels: the use of these resources for irrigated agriculture as opposed to dry-land farming and the use of the total water system available to district members—including nondistrict sources. Actual use of water supplied by any individual district will depend upon decisions reached at both levels.

Although the assessment is a fixed cost for a member's annual production decisions, its close relationship to the water toll—a variable cost for these decisions—makes it an indirect determinant of on-farm water use. The budgeted outlay of a public water district for the ensuing fiscal year must be secured in the form of sales receipts and assessments collected.²⁰ For a given outlay a change in

¹⁶ Before the Bureau of Reclamation awards delivery contracts, a field investigation is made of each district, for example: United States Bureau of Reclamation, *Factual Report, Madera Irrigation District, Central Valley Project, California* (Fresno, California: March 1950). Data made available to the district by the Bureau frequently have been used to modify older systems of valuation. This has been particularly true of the soil classification data.

¹⁷ From the initial Irrigation District Act of 1887 to 1911, legislation repeatedly required district assessments to provide revenue for bond principal and interest payment although water tolls were permitted in lieu of additional assessments to secure funds needed for the district operation, maintenance, and administration expenses. See California Laws, *op. cit.*, 1887, pp. 29-45; *idem*, 1889 p. 15; *idem*, 1891, p. 147; *idem*, 1909, p. 46.

¹⁸ In 1911, legislation permitted the board of directors of the irrigation district to use either the assessment or tolls to provide receipts for any district expense. See California Laws, *op. cit.*, 1911, p. 514.

¹⁹ The tendency toward change nevertheless exists. Less additional relative change in the same direction is needed to induce actual factor substitution than had the initial relative price change not taken place. The number of response alternatives are determined by the factor cost ratios, the technical possibilities for substitution, and the limitations on factor supply.

²⁰ A substantial number of California irrigation districts now receive revenue from other sources, including electricity sales, leases for falling water, land sales, etc. To the extent that this is true of a particular district, the statement following needs qualification.

the assessment structure resulting in larger assessment receipts is associated with a reduced water toll and lower water sales receipts. Change in the assessment structure in the opposite direction would be associated with a toll increase, providing an inelastic demand for district water over the range of increase.²¹

Although the district assessment initially appears as a cost of land ownership, its economic incidence will depend upon the degree to which it may be shifted. The dichotomy between the apparent and real burden of an assessment occurs when its imposition results in price changes. No such change occurs when it is levied upon the "cash value" or "market value" of land.²² This base, as mentioned above, was initially specified by legislation for the prototype district. Difficulties in ascertaining the "full cash value" and administrative problems in its application long have been recognized²³ and doubtless have contributed

to the adoption of other methods of land valuation by public water districts. So long as the incidence of the assessment falls upon the landowner the cost ratio between land and other factors of agricultural production (capital and labor) is altered, tending toward a substitution of the latter for land. Conversion from dry farming to irrigated cultivation represents such a factor recombination.

An additional stimulus toward irrigation is the cost-spreading consequences of the assessment, making available a larger part of gross farm returns for the relatively large on-farm capital outlay required to convert from dry farming during the initial years of irrigated cultivation.²⁴

The district assessment is only a partial determinant of the extent and rate of conversion from dry farming to irrigation. Accessibility to a supply of irrigation water imposes an upper limit to such conversion at any given time. Such accessibility over time is the consequence of the rate of water rights acquisition and the construction of distribution facilities by a district. The rate at which these activities take place is determined largely by physical characteristics of the

²¹ The degree and type of demand elasticity of district water with respect to the water toll varies with type of use and the availability of alternative sources. Domestic use has been found to be an inelastic demand as is irrigation for district water in single source districts so long as irrigation is continued or the marginal revenue product of irrigation water exceeds its variable unit cost. When alternative sources are available, however, the irrigation demand function frequently is truncated from below if it is supplemental to other sources or from above if it is the prime source but there exists a supplemental supply.

²² The "market value" implies a capitalization of anticipated future net returns. If the land yields no net returns, no tax base exists; there is no incentive for its withdrawal from current use and the supply of land is unaffected. To the extent that land is leased for less than its full economic rent the imposition of such an assessment may induce an increase in the leasing price. Except for strictly short-run situations, the lease price cannot exceed the economic rent as there is no increase in the physical productivity of land, nor in its demand. An assessment does not alter the price of the products produced, their demand remains the same, and ceasing production altogether would entail a net loss to the owner. See Roland R. Renne, *Land Economics* (New York, New York: Harper and Brothers, 1947), pp. 584-588.

²³ See John F. Shannon, *The Conflict Between Law and Administrative Practice in Valuation of Property for Taxation in Kentucky* (Lexington, Kentucky: University of Kentucky, May 1957). (Bureau of Business Research, College of Commerce Bulletin 31.)

²⁴ Analysis of 11 records of per-acre land development costs for irrigation in Coachella Valley from 1948-1950 ranged from \$63.00 to \$295.19. Comparable figures from Sacramento County in 1949 ranged from \$35.00 to \$124.34. The cost-spreading impact on the total district charges to a member irrigator, of course, will become quantitatively less significant as a higher portion of district land becomes irrigated. Wallace Sullivan and Lewis Hutchinson, *Land Development Costs, Coachella Valley*, University of California Agricultural Extension Service (Riverside, 1951), Processed.

A. D. Reed, R. G. Geiberger, and Torrey Lyons, *Sacramento Land Development Survey, 1949*, University of California Agricultural Extension Service (Sacramento, 1949), 4p. Processed.

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individual district, its financial position, and the availability of outside capital. The assessment may influence the latter two factors but clearly is not the sole determinant of the upper limit at which conversion may proceed.

Although a general stimulant to irrigated cultivation, there appears to be no systematic relationship between assessment size and cultivation of "high" or "low" water requirement crops grown in California districts. Analysis of crop patterns from ten districts indicates an inelastic water demand over the relevant range of variable costs. Irrigation water costs averaged 10 percent of the total variable cost of production for the principal irrigated crops and their year-to-year fluctuation has been small, relative to other inputs.²⁵ Furthermore, those districts that have available water from additional sources are affected by changes in the variable costs of district water only if marginally less than water from other sources.

Within a single source district the annual total variable cost of water to a member is determined by the water toll and the quantity he receives.²⁶ Total cost, of course, will include the additional fixed cost of the district assessment. For most irrigationists the relevant production interval is the irrigation season and annual production decisions are made on the basis of current toll.²⁷

²⁵ See Brewer, *op. cit.*, Table 11, p. 83.

²⁶ When an area base water toll is used, it is the area irrigated rather than the amount of district water used that determines the total variable cost. Under this type of base, individuals usually use their full individual entitlement if any district water is used.

²⁷ Although one may speculate that there is a temporal connection between the composition and magnitude of one year's total payment complex and that of subsequent years (through district repayment requirements or administrative commitment) there is little evidence supporting the assertion. If such

Districts providing supplemental water supply may adopt pricing policies specifically designed to influence the use of the total water system available to its members—including nondistrict sources. For example, one California irrigation district has established a water toll of \$2.20 an acre-foot for the announced purpose of limiting ground water draft and thus reducing the average depth to ground water beneath the district to 30 feet.²⁸ As the average acre-foot cost of pumping ground water currently averages in excess of \$3 the district supply of water has become the prime source for most members since this pricing policy has been implemented. Ground water measurements within the district indicate the effect of this program.²⁹

If the policy objective is achieved the decreased depth to water will constitute a considerable reduction in the aggregate pumping cost to members during years of deficit surface runoff.³⁰ Local assessment may be used in this way to induce a particular allocation of the total water supply available to a community even though the assessing organization has no regulatory authority over a major part of it.

were the case the annually fixed cost of district assessment also would become variable as disinvestment in land entered into longer run production decisions.

²⁸ See William Alexander, *Lower Tule River Irrigation District, History and Operational Report, 1950-1957* (Woodbridge, California: 1958).

²⁹ The district mean depth to water has decreased from an average of 90 feet in 1953 to approximately 70 feet in 1956. See United States Bureau of Reclamation, *Fresno Operations Field Branch, 1956 Water Supply* (Fresno, California: 1958), Plate 23. Processed.

³⁰ The district involved currently is contracting with the United States Bureau of Reclamation for a total of 180,000 acre-feet to be delivered during an "average year." Of this, 119,000 acre-feet are termed "Class 2" and subject to fluctuation depending on annual precipitation and snow-melt conditions. Under conditions such that no Class 2 water is delivered and other surface water sources are retarded it

Appraising of the Public Water District Assessment

The assessment practices of California irrigation districts may be appraised from at least two standpoints. Such an organization pursues objectives reflecting the interaction of constituent district interests. A district's pricing behavior, as manifest in the type of total payment adopted, may be appraised with criteria reflecting these constituent interests. Appraisal is possible also from the standpoint of society in general, reflecting the degree to which a particular pricing method facilitates efficient resource allocation and production organization.

The provision of water at least cost to members is an obvious constituent interest. The nonprofit nature of the public district, its power to issue bonds, and the technical economies of large-scale water development facilities are advantages from this standpoint. When district members use water from several sources, the assessment is properly evaluated in terms of the cost over time of the entire water system of which district deliveries may be only a part.

Assessment practices may result in unequal charges to individual members for similar benefits. Under these circumstances, being unable to disassociate from the organization at will, adversely affected individuals tend to form factions or dissension groups internal to the district. These may become sufficiently numerous and powerful in terms of mem-

ber voting blocs that district administration is unwieldy and difficult. The extent to which equity problems are avoided is a relevant evaluatory criterion.

A third constituent interest pertains to district solvency. The assessment and toll, the main sources of annual income, must be established so that receipts are adequate to meet outlays incurred through current activities and functions as well as the servicing and retirement of outstanding debt. Assessment practices may influence a district's solvency position in two ways. First, it may affect the certainty that revenues will be adequate to meet district outlays for a particular year or longer period of time;³¹ second, the level of assessments adopted by a district over a period of time may affect the marketability of district bonds and the rate of interest they carry.

Under systems of appropriative water rights law, both the extent and type of water use by district members may affect the tenure uncertainty of these rights, primarily in terms of their jeopardy to prescriptive capture.³² Insofar as the assessment practices influence the extent and type of water use, a fourth criterion, pertaining to the uncertainty status of district water rights, becomes relevant.

Appraisal of the assessment's impact on the general economy also is needed. The degree to which the local district may adjust itself efficiently to economic conditions of the state and nation is a satisfactory standard in this regard. Ad-

is anticipated that the district must secure 171,000 acre-feet from ground-water sources. It is estimated that the aggregate cost to district members of pumping this deficit would be \$684,800 using present equipment and pumping from present depths to water—and \$473,800 from a 30-foot depth. The average variable cost of pumping this quantity of water from a 30-foot depth with new equipment has been estimated at \$244,700. See Brewer, *op. cit.*, Tables 16 and 17, pp. 116-118.

³¹ As explained above the assessment is an unavoidable charge upon members. The district is accorded police powers for the purpose of its collection. District land delinquent in assessments may be sold under tax deed.

³² Under California water law both surface and ground water rights may be lost by open, adverse use for five consecutive years. For a discussion of uncertainty and water rights, see Ciriacy-Wantrup, *op. cit.*

justment possibilities are affected by a district's activities in two ways. The district's distribution system renders the water input more divisible as a factor of production than it otherwise would be and costs functionally related to the quantity used makes more production alternatives economically relevant to a district member.

An Evaluation of the Public Water District Assessment

These criteria are not necessarily mutually consistent. What may be a desirable practice from the standpoint of reducing the tenure uncertainty of a district's water rights may tend toward an inefficient use of irrigation water by members or give rise to equity conflicts. Evaluation must be based on the plural functions of price.

The most apparent advantage of the assessment stems from its predeterminable nature. Substantial parts of total district outlay are relatively fixed from year to year, especially during the early years of district operations.³³ A source of revenue that is similarly fixed holds obvious advantage. From the standpoint of other criteria the assessment appears a mixed blessing. Its use frequently leads to equity problems in districts with assessed but unirrigated land. Even when relatively full irrigation development has taken place within a district, equity problems may be entailed due to ground water pumping cost differentials.³⁴

³³ Although bonded debt may not be the largest item of district outlay, it is fixed at the time bonds are issued. In addition, most of the operation, maintenance, and administrative expenses of districts are not significantly related to the quantity of water sold by a district, being primarily incurred for the upkeep of the distribution system.

³⁴ Use of the assessment—a fixed cost—may "force" a group of members to use a district source even though they could pump the same quantity of water for lower total cost. Were no assessment used,

Use of the assessment is advantageous from the standpoint of increasing water rights security. Use-diligence³⁵ increases with the number of acres within a district irrigated from district supply. As discussed above, a payment complex with a relatively high assessment component stimulates expansion of district irrigation. For districts characterized by relatively full irrigation development, a high assessment-toll ratio encourages use of the district supply as a prime source—again a positive attribute from the standpoint of water right fortification.

As has been shown, surface-ground-water-management programs often are implemented by establishing the toll lower than the variable costs of securing water from alternative sources. The associated assessment thus becomes a residual. Although justified in terms of providing water at least cost to district members, resulting production may be frozen into inefficient patterns or excessive use may be made of applied water per acre irrigated, or both.

Inefficient production patterns require there to exist alternative uses—either other crops that might be grown in the same area or other areas for raising the irrigated crop currently grown within the district—for which water holds a higher value of marginal product. A relatively low average variable cost and marginal cost, associated with high assessments, permits the use of district deliveries for cropping alternatives with a correspondingly lower value of marginal product. It also promotes an economi-

the higher total cost of the district supply could, and presumably would, be avoided by using no water from this source.

³⁵ This connotes a legally recognized beneficial use and is generally synonymous with water use within the boundaries of the district.

cally "excessive" application of water on irrigated areas within the district.³⁶

Possibilities of such inefficiencies depend upon the area within which water transfer is feasible, the extent to which land of relatively high physical productivity lies within the district boundaries, and the size of the district's water supply. Two types of districts are important in this respect—older ones with substantial water rights of their own and newer districts receiving all or a large portion of their water supply under service contract from a central government agency. The boundaries of older districts generally include better quality lands potentially serviceable from the distribution facilities contemplated at the time of district formation. This, in combination with the limited opportunity for surface water exchange with other lands in the vicinity of the district,³⁷ reduces the chance of displacement of higher quality by lower quality land in irrigated cultivation.

Districts contracting for water from a conveyance system owned and operated by federal agencies usually have a substantially larger area in which water exchange is feasible.³⁸ Also, many are relatively young at the time of contract. Many such districts do not contain better quality land from the standpoint of irrigation as their boundaries frequently are determined by criteria other than susceptibility to and potential benefit from irrigation.³⁹ Water supply contracts, however, are awarded only for beneficial use within recipient districts.⁴⁰ Thus, the possibility for inefficiencies stemming from district assessment is tempered. In the first group of districts this is by the inclusion of "better" land within the district boundaries and the limited water exchange opportunities and, in the latter group, through delivery contract negotiations.

Public policy objectives frequently embody equity principles relating to the capture or equalization of consumers' surplus with consumers representing beneficiaries and net benefits received constituting their "surplus." This principle requires that member benefits be adjusted so that net benefits accruing to individual members are less than some predetermined quantity, or equal, or both. Often, this principle conceptually is subsumed in project-repayment policy

³⁶ The latter assertion implicitly assumes a physical production relationship with conventional properties of diminishing marginal returns. The nature of this relationship currently is under debate in the fields of soil science, agronomy, and plant physiology. See L. D. Beaver, *Soil Physics* 3rd ed. (New York, New York: John Wiley and Sons, Inc., 1956); and P. J. Kramer, *Plant and Soil Water Relationships* (New York, New York: McGraw-Hill Book Company, 1949). Experience indicates that irrigators assume this to be the case. In one California irrigation district no water toll was charged members prior to 1950. The excessive water use resulting from this policy caused local drainage problems. In 1950 a charge of \$1.00 per acre-foot used in excess of four acre-feet reduced the percentage of irrigated area using such excess water from 25 to 5 percent. Memorandum by R. V. Meikle, *Effects of the Four Acre-Feet Policy, 1950* (Turlock, California: Turlock Irrigation District, 1952). Processed.

³⁷ Surface water transfer requires a distribution system. Investment in such systems is discouraged as the uncertainty of future use thereof increases. Many irrigation districts traditionally have not given assurance of continuous water export as such export for five consecutive years jeopardizes the basic appropriative rights to prescriptive capture.

³⁸ Such wholesaling distribution facilities afford unique opportunities for interdistrict water exchange. For example, one canal in the Central Valley Project of California serves over 30 public water districts and exchanges have been arranged in both up-stream and down-stream directions.

³⁹ For example, one of the prototype districts, the Lower Tule River Irrigation District (formed in 1950), unsuccessfully attempted to organize in 1943 as a water conservation district with flood control as a major purpose.

⁴⁰ The contracts awarded by the Bureau of Reclamation to prototype districts are based upon field studies of each district that consider specifically the crop pattern, soils, and alternative sources of water available for use within the district.

and is manifest in measures that propose to charge or assess beneficiaries in proportion to total benefits received with total receipts being equal to budgeted outlays.

In appraising the public water district assessment as a tool for making such a charge, it is important to recognize services in addition to actual delivery of water to members which increase the capital value of land rather than net farm returns. The most apparent reason for property value enhancement is that a district member may receive a water supply from the district at a cost less than a similar supply from alternative sources.⁴¹ An increase in property values may occur also⁴² by virtue of the physically larger potential water supply, rendering district land both more flexible and more adaptable⁴³ than otherwise comparable non-district land. District activities similar to the ground water management program of the Lower Tule River Irrigation District also tend to increase the agricultural value⁴⁴ of nonirrigated as well as irrigated land overlying the common

ground water basin. If no assessment is levied upon a nonwater-using district member whose land value thus has been enhanced the equity principal may be violated. Efficiency considerations also are pertinent as the speculative motive frequently involves postponement of the transition to irrigation.⁴⁵

In addition to the difference in net returns per acre of irrigated over dry-farmed land, the assessment stimulus to irrigation may result in the early accrual of indirect or secondary benefits.⁴⁶ If the imposition of an assessment tends toward the early realization of both indirect and direct benefits, it is of policy relevance to analyze their incidence and, in terms of this, appraise the equity of assessment.

Indirect benefits resulting from processing and marketing of the agricultural products of irrigation districts, manifest in higher prices paid to producers, would pertain to land within the district as well as to proximate areas outside the district boundaries. Indirect benefits induced by the economic activities associated with irrigated agricultural production similarly would accrue equally to areas within as well as outside the district boundary. The relative magnitude would

⁴¹ This may not be a lower unit cost for every quantity of output, that is, district supply may be supplemental to a prime source; but the total supply of water available from the two sources is lower than a similar quantity supply from the prime source alone.

⁴² This hypothesis appears supported by land sales data from the field offices of the National Farm Loan Association in the San Joaquin Valley. See Brewer, *op. cit.*, pp. 126-132. Limited observations were made on land parcels in the same or adjoining township of similar soil characteristics and with alfalfa cropping histories. Average sales price per acre of land exclusive of buildings in constant 1940 dollars were \$179.43 within the Fresno Irrigation District and \$117.99 outside the district. Corresponding data for the Turlock Irrigation District were \$188.66 and \$80.19.

⁴³ Such land has greater flexibility in light of changing conditions of the ground-water table or other changes that might affect the cost of ground water and also greater adaptability to different uses requiring or utilizing varying amounts of water.

⁴⁴ This value concept is identified with the present value of the future income flow to be derived from such land.

⁴⁵ Such would be the case when speculative objectives include the capture of windfall profits due to a temporary increase in the demand for land for development purposes in an area in which early irrigation development was taking place. Other reasons for failure to convert to irrigation includes the unwillingness to undergo the relatively high initial costs of conversion.

⁴⁶ Two categories of secondary benefits frequently have been considered in the literature—those "stemming from" and "induced by" water development works. The former represents economic benefits accruing in connection with the processing of the immediate products produced as a result of development works. The latter refers to activities resulting from the expenditures by the producers of immediate products attributable to the district's activities. See Subcommittee on Benefits and Costs, *Proposed Practices for Economic Analysis of River Basin Projects* (Washington, D. C.: 1950). (Report to the Federal Inter-Agency River Basin Committee.)

vary inversely with the cost necessary to obtain such services or transportation costs, which tend to increase radially from the locus of such service industries.⁴⁷

The assessment appears an effective tool for achieving a cost incidence corresponding to indirect benefits within the boundaries of a district. Clearly, it does not impose costs on indirect non-member beneficiaries. Equity problems of this sort are general and have been manifest in the formation of "agricultural cities" adjacent to urban concentrations, enabling rural areas to withstand annexation while benefiting from activities originating within the urban concentration. Adjustments within the county tax structure or other means of shifting the bill for community support appear possible tools for changing the cost incidence in such situations.

Conclusion

The assessment of public water districts is an integral component of their water pricing mechanism and analysis must recognize its relationship to the water toll. In constituting a cost of owning land within the district the imposition of an assessment changes the price ratio of land to other agricultural inputs favoring their substitution for land. Simultaneously, changes in the assessment structure, through the complementary relationship of assessment receipts and water sales receipts, affect the variable cost of district water. In multiple-source districts this "indirect" effect has

been used purposively to induce use by members of a particular combination of water sources consistent with water management objectives.

Methods of land valuation for assessment purposes by irrigation districts have changed from flat rates to formulae based upon soil characteristics of individual land parcels. By this shift the assessment incidence is less reflective of secondary district benefits and more so of primary irrigation benefits. This appears to be in the interest of efficient production as the secondary benefits accruing to any given land parcel may be expected to become progressively smaller as irrigated cultivation becomes increasingly established regionally. Furthermore, upon land transfer, the capitalization of secondary benefits into its sales price has a similar effect as the district assessment in stimulating the substitution of irrigation-associated capital inputs for land. A continuation of relatively high assessments used during the early period of district development tends to shield member irrigators from the external economy and thus may cause "stickiness" in the response of district agricultural production to conditions of the agricultural economy at large.

The public district assessment has been used both as a source of revenue to these local units of government and as a tool for allocating available water sources. All three components of the assessment structure may be changed by administrative decision, rendering it a highly versatile economic lever for district response to internal problems of solvency, equity, and water management. It has been a fundamental source of flexibility to these important organizations and has enabled their adaptation to California's changing agricultural economy for over seventy years.

⁴⁷ It is of interest that assessment practices in the South San Joaquin Irrigation District during the period 1925-1930 entailed a valuation procedure that reduced the valuation for district assessment purposes radially from urban foci. Adams, *Irrigation District in California, 1929*, California Department of Public Works Bulletin 21, Sacramento, California, 1929.

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PART ONE

The New Frontier in Metropolitan PlanningROBERT B. MITCHELL

The Balanced Community: Homogeneity or
Heterogeneity in Residential Areas?HERBERT J. GANS

Newcomers' Problems in a
Suburban CommunityLUCY THOMA and ERICH LINDEMANN

(1) Metropolitan Horticulture:
A Photographic EssayWILLIAM A. GARNETT

Relocation: The Impact on Housing Welfare ...NATHANIEL LICHFIELD

Zoning for Mobile Homes: A Legal AnalysisARNOLD H. MAYS

(2) Review Article:

Made in USA—Goals for AmericaWILLIAM L. C. WHEATON

PART TWO

Steinberg On the CityA Graphic Essay by SAUL STEINBERG

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Urban Economics: An Appraisal of Progress

By RICHARD B. ANDREWS *

URBAN ECONOMICS has been forming rapidly since the early 1950's as a new, specialized discipline. It involves the study, measurement, and functional classification of the private economic and public enterprises and individualized investment activities which support and service the modern metropolitan community as they function in a regional and national economic setting. Beyond the generalized objective of understanding, the goals of urban economics are confined largely to population and land use prediction. There have developed in the evolution of this discipline several techniques of study and measurement. Most notable of these are the economic base approach, the input-output technique, and income-expenditure studies. Economic base analysis has been most impressive in its deductive, theoretical emphasis which has contributed heavily to our understanding of the workings of the urban economy. Input-output and income-expenditure analysis, on the other hand, are essentially inductive, empirical methods which are well suited to current mathematical techniques and consequently possess a flexibility which is lacking in economic base analysis.¹ At

present urban economics is witnessing a mild state of conflict between the deductive and semi-inductive schools of thought. Studies and technique development of an inductive nature are being promoted most vigorously by persons of academic standing led by the founders of another new field of inquiry known as regional science. The deductive approach is supported by two general groups. One of these is composed of consulting firms and practicing planners in the smaller urban centers. The other is made up of economists and administrators who have been influenced in varying degrees by the philosophy of institutional economics.²

Because of disagreement on emphasis and approach many weaknesses appear in the new-born discipline which may well lead to its retardation. One of these weaknesses is the tendency of urban economists to favor in a rather prejudiced manner one approach over another. While bias is said to give strength of direction to the thought process when applied to problem-solving the scientist must never be so puristic that he rejects entirely those portions of a less favored

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¹The terms "deduction" and "induction" employed in this article are not used in their strict sense as related to the scientific method. In the strict sense there is no conflict between the two but rather a complementary relationship in which both are considered essential to the method. The technique which is described here as being "deductive" is one which possesses great breadth of generalization. It embraces in its conception not only the parts and method of operation of the urban economic machine and the effect of this machine on total urban employment and population but also the reciprocal influences between the machine and

the urban social pattern, land use allocation, and systems of internal movement of people and goods. "Inductive" approaches as treated in this discussion have, by comparison, a sharply restricted scope of generalization in their urban applications. They are both more detailed and more precise as a consequence of the employment of mathematical models. However, as is true of pure deduction and induction, neither of these two approaches operating independently is sufficient to perform an adequate scientific job of urban analysis.

²Ralph W. Pfouts, *The Techniques of Urban Economic Analysis* (West Trenton, New Jersey: Chandler Davis Publishing Co., 1960); and Homer Hoyt, "The Utility of the Economic Base Method in Calculating Urban Growth," *Land Economics*, February 1961, pp. 51-58.

approach which he can use to strengthen his own interpretation of reality. Therefore, what is needed at this stage of development of urban economics is more respect for opposing points of view and consequently a greater degree of eclecticism in the construction of the methodology of the discipline. Generous applications of eclecticism alone will not, however, strengthen this field sufficiently for the challenging work that will be expected of it in the years ahead. There are conspicuous common gaps in both approaches which are not in the process of being filled at the present time. While some of these may be obvious to the "expert" observer they are studiously ignored by practitioners and theorists in this specialty.

It will be the objective of the discussion which follows (1) to explain the nature and seriousness of these shortcomings, (2) to suggest the means of overcoming them, and (3) to outline some of the means by which the strong features of the deductive and inductive slanted approaches can be blended.

Dynamism

The outstanding and in some respects fatal flaw in existing systems of urban economic analysis is the simple fact that they are not dynamic. A statistical "photographic still" is rendered of an urban economy at one moment of time. Subsequent economic studies are sometimes made in the same community but these occur after long intervals and frequently employ techniques that do not enable an easy meshing of the results of the separate survey operations. The urban economy and culture have far too many variables constantly at work within them to make findings and projections based on any one year of great significance for but

a very short span of time. When, therefore, we rely upon the "snapshot" approach we can be sure that we are working with highly perishable data which, if too freely and confidently applied at a point in time more than three or four years removed from the original project date, may actually endanger the community's health. The variables involved in any one analytical situation are exceedingly numerous. Consequently, they are likely, through multiple interaction, to produce completely different situations from those that existed before. There is also the very good chance that new variables will be introduced into the pattern as time passes. At the present time the most likely sources of these new variations are of an institutional and technological nature. New laws or legal interpretations, new or varying financial policies (private and public), new mechanical devices and materials, all introduce an element of uncertainty into the current urban scene with which our present techniques cannot hope to cope. Of the two general emphases, deductive and inductive, the inductive as conceived by the input-output method has what appears to be the answer to the dynamics problem. In brief, the system is one which registers the sympathetic reactions of the components of a metropolitan economy to a change in the production inputs and outputs of one or more key enterprise groups. From year to year it is hypothetically possible to predict the production of such a group or groups and therefore the changing input-output aggregates for the total local economy.³

³ By way of contrast, when the urban economic base approach is used it is not sufficient to know the nature of production change anticipated in a few enterprise groups. Recalculation of the entire base may be necessary. There is in addition the complex problem of determining the time of arrival of the long-run adjustment phase in the ratios.

This solution to the problem is, however, largely illusory. One weakness of the approach is the fact that the construction of the input-output matrix involving the determination of inter-industry and inter-firm reactions takes many months and even years in the case of large metropolitan areas. By the time this complicated statistical machine is ready to operate the laboriously computed input-output coefficients of many, if not all, of the component industries will have changed. Therefore, production data fed to the system will give results only in terms of inter-industry relationships as they existed at some time in the past.

Coverage and Depth

Both approaches attempt as complete coverage as possible. The urban economic base technique is usually the most successful in attaining nearly universal coverage. This is because it customarily seeks out rather simple and relatively accessible data. As a consequence, base studies are frequently more comparable than those put together by the two largely inductive techniques which vary widely in their coverage. In either instance, however, the tendency is to push coverage as far as budget and data will allow. This, in general, is considered to be good research practice. However, the argument raised here is that if a choice must be made—and it must—depth analysis rather than broad enterprise coverage is of far greater importance where urban economic analysis is involved. One is rather naively optimistic who expects employment, output, gross income and expenditure patterns from hundreds of enterprises to reveal the guiding undercurrents of a local economy. These factors are not only too scanty for the analytical work intended but also are largely

symptoms and, while important in that role, do not tell us what we need to know of the deeper trends within enterprise groups or entire community economies. Under present techniques we are simply throwing too many basic variables overboard in an attempt to see the whole picture. As it is, we are probably obtaining a very clear view of the *top* of the iceberg. A question can legitimately be raised as to whether or not the picture which we see by means of such coverage in any way approximates reality. Another important drawback to the complete coverage idea is, of course, that it contributes to the time lag between the inception of a study and its first application. Research budgets are, of course, also complicated by this practice.

Data Availability and Mensurability

In all social research we have a tendency to throw a cloud over data which are difficult to measure, to understand, or to integrate with the data already collected or with the hypothesis under test. We tell ourselves by way of rationalization that these data are unimportant. Or we may more honestly state that, while these materials are of great importance, those mutually related entities of budget and the project-endorsing authorities will not allow exploration of such recondite and untested areas of investigation. The situation may also be one in which the dominant method of analysis is not adapted in any way to certain areas of fact that are pertinent to a particular problem. More specifically, the subject matter that seems to be generally shunned by the dominant techniques of urban economics includes the previously mentioned areas of institutions and technology. To these may be added the broad area of "social change" in terms of population composi-

tion, income distribution, personal income-expenditure patterns, and value systems as they bear on city growth and structure. As might be expected, the inductive techniques have least to do with these three subject fields. The main reason for this situation seems to be the fact that a measurement system, particularly in dollar terms, cannot be applied to the truly significant socio-economic aspects of laws, mechanical devices, and leisure-time allocation. Even without the problem of measure there is the problem which exists for both approaches of finding the data of these phenomena in compact manageable form. These data are in many cases exceedingly diffuse and elusive. Economic base analysis techniques are generally more adaptable to materials of this kind inasmuch as the statistical emphasis is at a much lower level of refinement and essay analysis is in greater volume. But because of the coverage impasse combined with the special data difficulties just described these more "generalized" subjects are quietly tucked away even by the base analyst with no more than a nod of recognition. How can we expect to make a respectable social study of urban economics if our rationale of data selection and study technique proceeds indefinitely along the lines described?

Precision of Procedure and Results

It is one of the goals of every science and of the social sciences in particular to sharpen the precision of the procedures and thereby increase the accuracy of the findings for purposes of prediction. The recent dramatic arrival of mathematical techniques in the social sciences which has given us linear programming, systems analysis, and operations research has had its greatest impact

on the most mathematical of these sciences—economics. Econometrics is now a well established field of study and tool chest of analytical devices on which the substantive fields of economics, old and new, may draw in their efforts to move further toward the goal of precision. Urban economics has joined in this familiar struggle toward quantification, refinement, and formula by swinging its major research and concept-forming efforts over to the inductive approach which is, of course, most amenable to the methods of mathematics. This trend has given rise to the application of input-output analysis of operations research to the measurement of urban economies and the character of their internal changes. While these tendencies within the field of urban economics are, on the whole, laudatory, a few substantial questions must be raised. One of these questions stems from the preceding section on measurability. How can we pretend to attain to maximum precision if we are measuring only the data that can be mathematically quantified and if the data that are measured tend to be more in the category of effect than of cause? In urban economic analysis situations there exist a very large number of variables. While these are not a particularly formidable obstacle to mathematical analysis they become so if some of the variables are not only difficult to measure but are also highly unstable and unpredictable in themselves. What this suggests is that urban economic analysis could improve its effectiveness by applying mathematical techniques to those data that cannot only be measured but will also yield significant information patterns when combined with results compiled from non-mathematical procedures that have been applied to more amorphous materials.

It is frequently argued that we can never attain to anything like precision in population and land use prediction. The basis for this belief lies again, of course, in the number and character of the variables involved as well as in a dearth of organized data. Nonetheless, there is every reason to believe that we have a very long way to go before we have reached the ceiling of possibilities in the field of measurement and educated estimate. While such a stage may still be a long way from peak precision it will be far closer to that state than we are today.

It appears, nonetheless, from our great concern over the perfection of population and land use estimates that we are missing some of the more valuable contributions that can be made by the techniques of urban economic analysis which do not require data relationships of high precision. It is, for example, of utmost importance to a community to know the quantitative and qualitative trend of its economy. There is little doubt that, if a constant quantitative growth is in effect, the *rate* of this growth is the next question of public concern. When and if the rate of growth is no longer a problem then the qualitative status of the economic pattern should become a matter of interest. Local governments and chambers of commerce have for many years shown interest in "proper balance" of their economies. However, "balance" has been very crudely and improperly interpreted to mean "more manufacturing of the right kind." The selection of enterprises by localities and the comprehensive guided development of the entire economy of a metropolitan area has almost never been attempted with proper consideration of the relation of that economy to its regional and regional-group setting. It would be a far better thing if we could be content with broad

limits in our population and land use estimates and rather concentrate our efforts more heavily on problems of determining optimum size and character of the urban economy and the efficiency of its operation as measured by carefully conceived goals. This would seem the higher and more appropriate objective for the study of urban economics.

Proposals

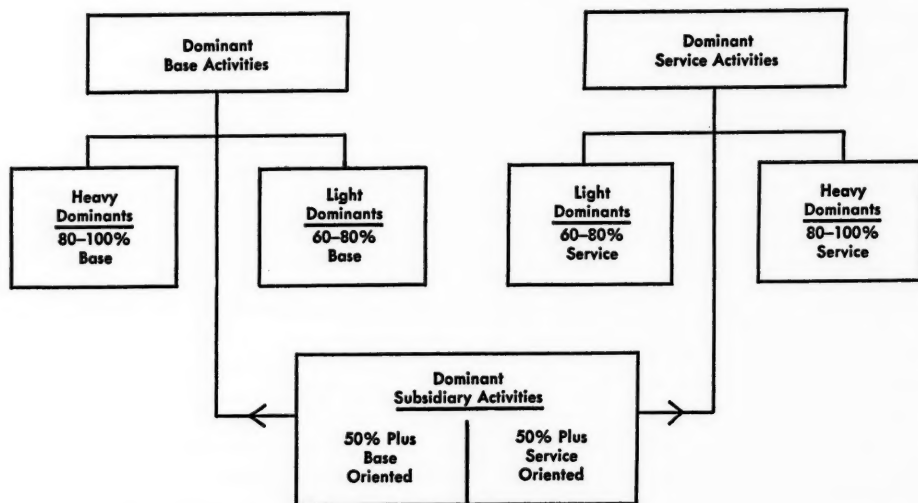
It will be the purpose here to present in outline form a few proposals for the improvement of urban economic study techniques through a combining of selected elements from the deductive and inductive approaches and the correction of some blind spots common to each.

To recapitulate, the three major inadequacies of present methods of urban economic analysis are absence of dynamics, lack of depth, and avoidance of areas that are difficult to measure and analyze. It is possible that the last two problems of depth and difficult material are closely related and that the solution of the first will involve the second. In the present state of the arts as they relate to urban economic studies—and with a dearth of organized data—it is certain that we cannot obtain dynamics, depth, and broad coverage simultaneously in reference to one community. Therefore, it is proposed that we make a substantial retreat from our goal of maximum coverage and consider the virtues of selective sampling. According to what criteria might this sampling proceed? A sensible approach would be to select from a metropolitan economy those enterprises (firms and firm groups) which dominate that economy.⁴ Dominance could be deter-

⁴ The expression "firm" or "firm group" is actually too specialized in its common meaning. It is the intention of this approach to include all large-

mined by a combination of weights including employment, total annual wage payments, value of goods produced, sales volume, plant investment and others that will be described shortly in list form. Dominant activities could then be placed into three general urban economic structural categories. These categories would include dominant base or export activities, dominant service or local activities, and dominant subsidiary enterprises that are oriented in their business relations to other firms in the economy rather than to the ultimate consumer. Each of these three principal categories would then be subdivided for analytical purposes into two sub-categories. For example, the dominant base category would be composed of a heavy dominant group in which between 80

and 100 percent of sales were to points outside the metropolitan area. Light dominants of the base group would be those firms with export sales somewhere between 60 and 80 percent of their total average activity. A similar breakdown would be made of the local service dominants. In the case of dominant subsidiary enterprises the two-way division is one of orientation. Some subsidiaries have a majority of their dealings with exporters providing them with manufacturers' parts and specialized services; others are more closely oriented to local service firms via wholesaling arrangements, accounting services, and the like. The composition of the principal categories and their interrelationships are shown in the diagram.



scale or significant activities of a community which contribute directly or indirectly to its economic life. In this broader conception would be included universities, medical centers, museum and library complexes, tourist attractions, and the like. Some of these would, of course, not be amenable to the macroanalytical procedures which will be described at a later point.

It is further suggested that the principal and sub-categories each be assigned a rank or an order of importance within the local economy. The purpose of the ranking system would be to serve as an indicator of the relative importance of

the changes which might be taking place in one part of the economy. It would also have the operational advantage of showing a research team the appropriate point of beginning for their efforts and the order of progress as they built up the analytical system. The underlying conception of the ranking system stems from base theory and assigns the top rankings or heavier weights to those activities which are export-oriented and lightest weights or lowest rankings to those which are service-oriented. Rank order of dominant enterprises arranged according to this principle would appear as follows:

Category	Rank
<i>Dominant Base Activities</i>	
Heavy-Base Dominants	1
Light-Base Dominants	2
<i>Dominant Subsidiaries</i>	
Base-Oriented	3
<i>Dominant Service Activities</i>	
Light-Service Dominants	4
Heavy-Service Dominants	5
<i>Dominant Subsidiaries</i>	
Service-Oriented	6

Within the ranks the order of importance of dominants is determined by a weighting system, the elements of which are classified in approximate priority order below:

I.

Economic Strength

1. Average monthly employment.
2. Average annual payroll.
3. Average annual sales dollar volume.
4. Capital investment in plant.

II.

Economic Interrelations

1. Assessed valuation.
2. Total tax revenues returned.
3. Physical relation of customer to purchase and consumption of good or service produced by dominant.
4. "Breeder-type" characteristics.
5. Volume of ties to all subsidiaries.
6. Volume of local purchases.
7. Single firm or multi-firm status.

III.

Intangibles

1. Prestige.
2. Political influence.

It is a further assumption of the procedure that quantitative changes (positive or negative) in a dominant enterprise would influence the general economic health of an urban community in direct relation to its rank order, i.e., rank order 1 enterprises, most influential—and so on. A hierarchy of influence would also be found among the dominants, change in rank 1 influencing rank 2, and so on. It is at this point that application of the input-output technique would be of particular value.

Subdominant activities of a metropolitan community particularly those in the export category represent, of course, a "seedbed" of emerging or potential dominant activities. Hence, the changing character of the subdominant area would be of importance from both a quantitative and qualitative viewpoint in forecasting the nature and rate of change of the aggregate of dominants in the community. Frequent check of the status of activities and activity groups that were on the margin between subdominance and dominance would be a necessary part of the dynamic approach.

The range of economic activity coverage suggested in the proposal just outlined, although relatively restricted, would still be an ambitious undertaking for any metropolitan area. It might be well therefore to expand the system gradually beginning with rank 1 and working down over the years until a sampling of the entire economy was under control. Such a procedure would have obvious administrative and budgetary advantages. In its early stages, although very limited in its coverage, the system would provide valuable planning and economic policy guidance for the community. A planning department staff would, moreover, have the opportunity to adapt its thinking to the system and devise special

modifications called for by local conditions. Most important of all would be the fact that the continuous system of fact collection and analysis employed by the method could be more carefully and thoroughly developed under conditions of gradual extension of coverage.

The remaining problems which the technique is designed to solve are those of depth analysis and analysis of difficult subject areas. Because the application of depth analysis to the dominant-activities approach is rather detailed, an outline of procedure will have to suffice at this time.⁵ In general, depth-analysis procedures would be divided into macroanalytic and microanalytic approaches.

Macroanalysis which would be applied to the dominant export and export-oriented subsidiary enterprises would examine the national, regional-group, and regional characteristics and tendencies of those activities on a continuous basis. Such continuous analysis would investigate all fields of pertinent subject matter for which data could be obtained ranging from production techniques, wage scales, and labor relations to technological, geographical, and financial trends. By interregional input-output analysis many of these items could be reduced to local area terms. Others such as technological, legal, and general corporate policy tendencies would have to be rendered in terms of broader institutional analysis. Impact of broadscale social change on the dominant export activities would also be a part of the macroanalytic approach.

Microanalysis as conceived in this method applies to *all* dominant activities

in terms of their characteristics, tendencies, and policies within the metropolitan area. The same general subject matter areas would be analyzed as under macroanalysis. However, because of the greater volume and availability of data the dominants could be studied not only in greater depth but also with greater frequency than under macroanalysis. Periodic comparisons between macro and micro data would show the changing relative position of the export dominants within their own specialized fields of competition or activity. Comparisons of micro data with general local economic and social indicators and with tendencies within the marginal subdominant enterprises would give further perspective to this motion picture version of the metropolitan economic scene.

In concluding these remarks it is appropriate to comment briefly on some of the peculiarities and shortcomings of the proposals which have been made. It is clear, no doubt, that the conspicuous differences between the dominant-activities approach and the two principal representatives of the deductive and inductive methods are (1) sampling versus complete coverage, and (2) a merging of the two main approaches versus pure forms. Insofar as the deductive base approach is concerned another difference exists in the approach to the firm. Standard theory focuses its attention on the task of splitting all employment, sales, or whatever the measure, by firm into a base or service classification. As a result, if the employment measure is used, a particular community may be said to have X number base employees and X number service employees—in short, a gross count within each of the two categories. The dominant activities approach, on the other hand, classifies firms or firm groups intact according to

⁵The general principles of this approach were developed in cooperation with Professor Herman G. Berkman, University of Wisconsin-Milwaukee in 1956 at the request of the Department of City Planning at Madison, Wisconsin.

their degree of dominance within their particular category (base, service, subsidiary) which is, in turn, determined by an arbitrary proportion, i.e., more than 60 percent base, more than 60 percent service, etc. A conceptual difference between the two approaches is found in the idea of a "dominant subsidiary" category. This additional classification is intended to bring into stronger relief those ancillary urban economic activities represented by independent firms which are a vital part of the productive process of base and service dominants. In order to tighten the concept and to focus on vital linkages, only those activities are classified as "subsidiary" which are essentially dependent marketwise on base and service activities rather than on independent outside or local retail markets.

One of the more troublesome aspects of the dominant-activities approach is the definition or selection of the degree of dominance. Dominance should be "clear-cut" but this is a condition open to wide interpretation. Certainly, so many firms or firm groups should not be included that the advantages of "sampling" are lost and the depth potential of individual continuous analysis is impaired. However, it is unlikely that in any one community the number of firms or groups in the 60-percent-plus base category or base-oriented-subsidiary category would be very numerous. In the case of the service category the possibilities of a large number of firms above the 60-percent level is great, hence the deter-

mination of the cut-off point between dominance and subdominance would be more difficult to make. But a bias toward a restricted definition of dominance would not be as important with this category as with the base. In any event this is one concept which would have to be sharpened by empirical testing.

A final criticism of the theory involved in the current proposal is the fact that imports are not given the same weight as exports. While this is essentially correct it must be remembered that imports by dominant enterprises will or can be brought out by the application of input-output analysis to inter-dominant relations within a metropolitan economy. However, in the final analysis of data greater weight is actually given to dominant exporters or export-oriented subsidiaries. Analysis of imports is purposely slighted in order to allow deeper research into not only the nature of export activity but also the non-export side of goods and service production. It is believed, moreover, that if any alarming and avoidable import leakages were occurring in the economy they would be adequately revealed by microanalysis of the sample dominants and by comparison of these findings with the yardstick of macroanalysis.

It is the hope of the author that the proposals which have been made in this article can to some extent counter the inadequacies of the deductive and inductive systems that have created urban economics.

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Contents for Summer 1961 (Volume 28, Number 3)

THE PROCESSED VOTER AND THE NEW POLITICAL SCIENCE	Howard B. White
THE QUALITY OF MERCY—ON THE ROLE OF CLEMENCY IN THE APPARATUS OF JUSTICE	Otto Kirchheimer
DESCARTES' "OLYMPICA"	Richard Kennington
RISK, UTILITY, AND SOCIAL POLICY	William Vickrey
FORUM—"THE ACQUISITIVE URGE" COMMENT	John Friedmann
REJOINDER	Justus M. van der Kroef
FORUM—IS THE PUBLIC DEBT A BURDEN ON FUTURE GENERATIONS?	Hans Neisser
REVIEW NOTE—ORDER AND HISTORY	Ellis Sandoz
BOOK REVIEWS	

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The Statistical Measurement of Urbanization and Economic Development †

By LEO F. SCHNORE *

Introduction

AN EXAMINATION of the literature reveals that the relationship between urbanization and economic development is often regarded as virtually invariant, both historically and cross-culturally. More particularly, "industrialization" is commonly taken to be the prime motivating force behind the massing of large numbers in urban agglomerations. Thus Davis and Golden assert:

"The achievement of high levels of urbanization had to await the Industrial Revolution. This remarkable transformation had its rise in one part of the world, western Europe, and thence spread to other parts as industrialism spread. . . . The explanation of the world-wide, if unequal, diffusion of urbanization is seemingly the fact that industrialism has had an impact nearly everywhere. Though concentrated in certain centres, it has thrown out its influence through a network of commerce—commerce which brings to non-industrial areas the products of industry and exchanges them for the raw materials necessary for industry."¹

In another place, these same authors report a zero-order Pearsonian correlation of +.86 between urbanization (defined

as the proportion of the population in places of 20,000 or more inhabitants) and industrialization (as indexed by the percentage of economically active males engaged in non-agricultural pursuits).²

Now when industrialization is defined in such terms its relationship with urbanization may be regarded as virtually tautological, given the locational characteristics of agricultural and non-agricultural activities. "Primary" industries, a class in which agriculture is the most prominent member, tend to be "field-oriented" and also extensive users of land, while "secondary" (manufacturing) and "tertiary" (service) industries are relatively "center-oriented" and intensive users of space.³ Yet these gross associations yield an incomplete picture. As Hoselitz has pointed out, "although industrialization and urbanization go usually hand in hand, there is no necessary connection between the two processes. Industries can be and have been established in rural districts, and cities have grown up without large industrial plants."⁴ Historically too, the association posited is inexact, as Heberle reminds us: "Industrialization and urbanization should not be considered as identical

† The basic data for this study were originally collated by the author while he was associated with International Urban Research, University of California (Berkeley). He is grateful to that organization for permission to use these materials. Completion of the study was made possible by a Ford Foundation grant to the University of Wisconsin for the support of urban studies.

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¹ Kingsley Davis and Hilda Hertz (Golden), "The World Distribution of Urbanization," *Bulletin of the International Statistical Institute*, Part 4, 1954, pp. 233, 236.

² Kingsley Davis and Hilda Hertz (Golden), "Urbanization and the Development of Pre-Industrial Areas," *Economic Development and Cultural Change*, October 1954, p. 8.

³ Edgar M. Hoover, *The Location of Economic Activity* (New York: McGraw-Hill Book Co., 1948); Walter Isard, *Location and Space-Economy* (New York: John Wiley and Sons, 1956).

⁴ Bert F. Hoselitz, "The City, the Factory, and Economic Growth," *American Economic Review*, May 1955, p. 167.

processes. . . . Cities have been in existence before industrialization, and not all cities are highly industrialized."⁵

Indisputable as they are, these observations may well be irrelevant when current *national* levels of urbanization are at issue. Together with Davis and Golden, we must distinguish between the simple *existence* of cities and the relative *extent* of urbanization. As they show clearly, "some degree of urbanization is present virtually everywhere. . . . Not only is there no major continent without a city [of 100,000 or more inhabitants] but also there is no major country without one."⁶

To the writer's knowledge, only one empirical study has attempted to go beyond the simple identification of urbanization with industrialization; this effort, however, also turns out to be a "single factor" theory, albeit in a sophisticated version. On the implicit assumption that greater dispersal of natural resources in use—or "objects of consumption"—requires larger relative complements in the non-extractive and city-oriented industries, Gibbs and Martin argue that levels of urbanization are associated with variations in a measure ("million dollar miles") that incorporates both the volume of goods and the distances traversed in shipment. In other words, urbanization is said to be related to trade, and especially to international trade, rather than to level of economic development *per se*. Whether the above assumption is actually justified or not, the correlations are high and in the direction that conforms to the specifications of the hypothesis.⁷

At this point it is necessary to introduce more precise definitions of our

terms. With respect to "urbanization" we will follow Eldridge, who holds: "Urbanization is a process of population concentration. It proceeds in two ways: the multiplication of points of population concentration and the increase in size of individual concentrations."⁸ In similar fashion we shall follow Davis and Golden and speak of the *level* of urbanization as the proportion of the national population that is found in such concentrations. The use of such a relative measure permits the comparative study of urbanization on an international scale.⁹

With respect to "industrialization" one can have no real objection to the Davis-Golden measure; it is readily obtainable, relatively unambiguous, and probably equal in validity to any feasible alternative. However, it is desirable to supplement it with measures of other aspects of modernization. We adopt this procedural principle for two leading reasons: (1) a conviction that urbanization has other measurable correlates; (2) an interest in the interrelations among these other facets of modernization.

Regarding the first basis for extending the analysis, informal observation suggests that there might be a host of associated traits shared by urban-industrial societies, many of which can be regarded as independent variables with respect to

⁵ Jack P. Gibbs and Walter T. Martin, "Urbanization and Natural Resources: A Study in Organizational Ecology," *American Sociological Review*, June 1958, pp. 266-277.

⁶ Hope Tisdale Eldridge, "The Process of Urbanization," *Social Forces*, March 1942, p. 311.

⁷ It must be admitted that this conception of urbanization is narrowly demographic in scope. However, Eldridge has argued convincingly that "the concomitants of urbanization are not to be ignored; they are simply to be distinguished from it." (*Ibid.*) In other words, we see little utility at this point in attempting to deal *simultaneously* with urbanization seen as population concentration, pure and simple, and with "urbanism as a way of life." (See Nels Anderson, "Urbanism and Urbanization," *American Journal of Sociology*, July 1959, pp. 68-73.)

⁸ Rudolf Heberle, "Social Consequences of the Industrialization of Southern Cities," *Social Forces*, October 1948, p. 29.

⁹ "The World Distribution of Urbanization," *op. cit.*, pp. 235-236.

urbanization and others of which seem to be consequences of urbanization. Moreover, a series of tables for major world regions, gathered from a wide variety of sources, clearly indicates the existence of a cluster of associated characteristics—including urbanization—that define the “modern” as over against the “underdeveloped” areas.¹⁰

As for the interrelations among these indicators of modernization, a review of the literature reveals a striking fact: *prior research has tended to fragment the question, for each investigator appears to have been preoccupied with one variable and to have designed his analysis to reveal the inter-relations of one factor with all others.* The result is a patchwork of disparate findings lacking any integration despite the mutual relevance of the research goals. Thus Kindleberger shows a series of some 25 graphs, displaying the associations between per capita income and “other economic measures positively correlated with income.”¹¹ Similarly, Jaffe and Stewart present a series of charts that indicate the relationships between various aspects of development and the proportion of the aged (65+) male population that is found in the work force.¹² Again, Shannon has compiled a wealth of data for the self-governing nations and dependent territories of the world; the question at issue is the extent to which these two political types differ in measurable terms and not the manifold relationships between these objective

characteristics.¹³ Other empirical analyses, focussing upon narrowly political questions and confined to limited parts of the world, have been more recently prepared by Lipset and Kornhauser.¹⁴ In like fashion the studies by Lerner and Golden are focussed on the associations between various aspects of modernization on the one hand, and levels of literacy on the other.¹⁵

Some of the literature makes enormously effective use of only a few variables. The outstanding example is undoubtedly Kuznets' exhaustive exploration of international variations in the industrial structure of the labor force. In the course of his splendid analysis Kuznets examines the association between labor force structure and per capita income and demonstrates that a large number of variables are not prerequisites to profitable inquiry.¹⁶ In this connection mention must also be made of the pioneering empirical work of Colin Clark.¹⁷ Other portions of the literature have

¹⁰ Lyle W. Shannon, “Is Level of Development Related to Capacity for Self-Government?” *American Journal of Economics and Sociology*, July 1958, pp. 367–381; Lyle W. Shannon, “Socio-Economic Development and Political Status,” *Social Problems*, Fall 1959, pp. 157–169.

¹¹ Seymour Martin Lipset, “Some Social Requisites of Democracy: Economic Development and Political Legitimacy,” *American Political Science Review*, March 1959, pp. 69–105; William Kornhauser, *The Politics of Mass Society* (Glencoe, Illinois: Free Press, 1959).

¹² Daniel Lerner, “Communication Systems and Social Systems: A Statistical Exploration in History and Policy,” *Behavioral Science*, October 1957, pp. 266–275; Daniel Lerner, *The Passing of Traditional Society: Modernizing the Middle East* (Glencoe, Illinois: Free Press, 1958); Hilda Hertz Golden, “Literacy and Social Change in Underdeveloped Countries,” *Rural Sociology*, March 1955, pp. 1–7.

¹³ Simon Kuznets, “Quantitative Aspects of the Economic Growth of Nations: II. Industrial Distribution of National Product and Labor Force,” *Economic Development and Cultural Change*, July 1957, supplement, pp. 1–111.

¹⁴ Colin Clark, *The Conditions of Economic Progress* (London, England: Macmillan Co., Ltd., 1940, 1951, 1957).

¹⁰ Joseph J. Spengler, “Economic Factors in the Development of Densely Settled Areas,” *Proceedings of the American Philosophical Society*, February 1951, pp. 20–53; J. P. Cole, *Geography of World Affairs* (Harmondsworth, Middlesex, England: Penguin Books, 1959).

¹¹ Charles P. Kindleberger, *Economic Development* (New York: McGraw-Hill Book Co., 1958), p. 5.

¹² A. J. Jaffe and Charles D. Stewart, *Manpower Resources and Utilization* (New York: John Wiley and Sons, 1951), pp. 401–414.

focussed upon international variations in production or consumption, as in the work of Olson and of Bennett. Olson's effort was initially guided by a desire to find an alternative measure for areas in which income data were deficient or wholly non-existent.¹⁸ Bennett's goal was simply to rank an array of nations with respect to levels of consumption.¹⁹ Finally, a composite ranking of nations and territories based upon 17 indices of modernization has been presented by Shannon.²⁰

In any event, an exploration of the extant literature reveals a peculiar gap: almost no effort has been directed toward simultaneously ascertaining the manifold associations among a large number of indicators of modernization. Thus, in addition to a specific study of *the correlates of urbanization*, the present paper is designed to provide *by-product data on the statistical interrelations between these other indices of modernization*. In short, it is hoped that a dual contribution may result; not only do we wish to further our understanding of urbanization but we intend to explore the full matrix of "modernization" within which increased population concentration presumably occurs.

Data and Methods, Sources and Problems

One reason for the apparent failure to establish the empirical parameters of economic development is undoubtedly the inadequacy of basic data for comparative

use. As writer after writer has observed, the inauguration and maintenance of effective data-collection systems are themselves indicators of modernization. Both scientific and practical programs require data possessing minimal degrees of reliability; unfortunately, such materials are apparently the by-products of economic development in general. Thus data are either wholly lacking or plainly deficient in the very parts of the world for which we must have information. Still the situation is not as bleak as it is frequently portrayed. The efforts of various agencies of the United Nations have gone far in the direction of improvement in quality and standardization and with respect to both "horizontal" (geographical) coverage and "vertical" depth or intensity.²¹ It is perhaps no accident that virtually all of the empirical studies cited above date from the onset of World War II with most of them appearing in the last decade.

In any event, the problems of coverage faced by any statistical inquiry with global pretensions are basically two in number: (1) problems of sheer *areal* coverage or geographic completeness, and (2) problems of *temporal* specificity. The United Nations currently recognizes roughly 200 self-governing nations and dependent territories, the latter covering a rather bewildering array of political statuses: colonies, trust territories, condominiums, protectorates, etc. Out of this welter of political units we have been able to secure essentially comparable data for 75 countries and territories; although not large, this number exceeds that used in most of the studies cited above and (depending upon the item in

¹⁸ Ernest C. Olson, "Factors Affecting International Differences in Production," *American Economic Review*, May 1948, pp. 502-522.

¹⁹ M. K. Bennett, "International Disparities in Consumption Levels," *American Economic Review*, September 1951, pp. 632-649.

²⁰ Lyle W. Shannon, *Underdeveloped Areas* (New York: Harper & Bros.: 1957).

²¹ Philip M. Hauser, "Demographic Indicators of Economic Development," *Economic Development and Cultural Change*, January 1959, pp. 98-116.

question) appears to cover from 70 to 80 percent of world population, mainland China excepted. (These 75 nations and territories, grouped in broad regions, are listed in Table V.)

With respect to the temporal dimension there are analogous difficulties. For one thing, practically a cross-sectional approach is demanded. However, even aside from the lack of longitudinal or historical materials for most parts of the world, it is extremely difficult to pinpoint the international data to one year. For the most part the items employed here refer to the early 'fifties with only two to four years separating the various political units on most variables.

The variables employed are twelve in number: two measures of urbanization and ten indicators of modernization. They are shown, together with the basic sources, in Table I. Limitations of space prohibit a detailed discussion of the quality of these data; evaluations are contained in some of the sources. Needless to say, the basic data are far from perfect. The coverage also varies considerably from item to item with the most thorough reporting achieved for newspaper circulation. The least satisfactory item from the standpoint of areal scope is per capita income, despite the importance attached to it in most discussions of economic development.

The major statistical methods employed all depend upon the use of rank-order correlations. Although most previous studies—including those by Olson, Lerner, Wilkinson, Golden, and Davis and Golden—have used product-moment correlations, this technique was deemed inappropriate here in view of the assumptions involved—particularly those concerning homoscedasticity and a bivariate normal distribution. The less demanding measure of rank correlation

seems much more suitable, considering the form of the data.

The second major method employed was that of factor analysis, based on a rank-correlation matrix. Although this technique has had its primary application in the analysis of individual traits it is coming into somewhat more frequent use with group attributes.²² One rather unusual feature of our factor analysis is its dependence upon rank-order rather than product-moment correlations. Although this somewhat novel usage may be questioned from a strict mathematical standpoint, it must be remembered that a rank-order coefficient represents the product-moment correlation of the ranks. We rest our decision to conduct the factor analysis upon this formal property of the underlying measure.

Results

The findings of our investigations up to this point may be set out in a series of six tables. For various reasons, including the quality and coverage of the data, we must underscore the wholly tentative character of these results. Extension of the geographic scope of the analysis, the addition of other variables, and the use of alternative methods would almost certainly alter some of the specific results and might even cause us to modify the inferences drawn.²³

²² See the studies by Thorndike, Price, Hofstaetter, Hammond, and Cattell and his associates, all cited in the comprehensive bibliography assembled by Benjamin Fruchter, *Introduction to Factor Analysis* (New York: D. Van Nostrand Co., 1954).

²³ A factor analysis by principal components methods for 95 countries and 43 variables has extracted five factors. See Brian J. L. Berry, "An Inductive Approach to the Regionalization of Economic Development," Norton Ginsburg (Editor), *Essays on Geography and Economic Development* (Chicago, Illinois: Department of Geography, University of Chicago, 1960), pp. 78-107.

A. The Correlates of Urbanization

First of all, we may raise again the question that initially gave rise to the study: in addition to industrialization, are there any other measurable correlates of urbanization? A positive answer is summarized in Table I where the two measures of urbanization are shown in

relation to the ten indicators of modernization previously listed. Several points deserve mention. First, one may be struck with the size of most of the coefficients, for eighteen out of twenty lie between .50 and .90. Second, it will be noted that a few indices (energy consumption, newspaper circulation, and availability of physicians) yield correla-

TABLE I—SPEARMAN RANK-CORRELATION COEFFICIENTS FOR CORRELATIONS OF TWO MEASURES OF URBANIZATION WITH TEN INDICATORS OF MODERNIZATION: CIRCA 1950-1955

Indicators of modernization ¹	Urbanization ²		Metropolitanization ³	
	r	N	r	N
1. Per capita consumption of energy from commercial sources, in metric tons of coal, 1952	+ .84	72	+ .83	73
2. Motor vehicles registered per capita, 1950-1955	+ .74	67	+ .80	67
3. Daily newspaper circulation per 1,000 inhabitants, 1952-1955	+ .82	73	+ .82	74
4. Percent of economically active males engaged in non-extractive pursuits, i.e., in other than agriculture, forestry, and fishing, around 1950	+ .77	69	+ .87	69
5. International trade: Per capita value of imports and exports in millions of U. S. dollars, 1954	+ .55	65	+ .63	64
6. Per capita income in U. S. dollars, 1949	+ .69	54	+ .74	54
7. Number of physicians and surgeons per 1,000 population, 1948-1951	+ .78	68	+ .81	69
8. Percent literate in population 15 years of age and over, 1948-1951	+ .73	73	+ .76	73
9. Average annual percent change in total population between two most recent censuses	-.21	67	-.24	67
10. Age composition: Index of dependency; ratio of ages 15-64 to all other ages, 1947-1957	+ .56	62	+ .52	63

¹ Sources: Items 1, 2, 5: United Nations, *Statistical Yearbook* (New York: United Nations, 1955-1956). Items 3, 7, 8: United Nations, *Report on the World Social Situation* (New York: United Nations, 1957). Items 4, 9: United Nations, *Demographic Yearbook* (New York: United Nations, 1948-1956). Item 6: United Nations, *National and Per Capita Income in 70 Countries, 1949* (New York: United Nations, 1950). Item 10: United Nations, *The Aging of Populations and Its Economic and Social Implications* (New York: United Nations, 1956); and Vasilios G. Valaoras, "Young and Aged Populations," *Annals of the American Academy of Political and Social Science*, March 1958, pp. 69-83.

² Percent of total population in urban places of 20,000 or more inhabitants, most recent census. Compiled from census sources by International Urban Research.

³ Percent of total population in "metropolitan areas," most recent census. From International Urban Research, University of California, *The World's Metropolitan Areas* (Berkeley: University of California Press, 1959).

tions with "urbanization" that are slightly higher than does "industrialization" as measured by Davis and Golden. At the same time industrialization shows the highest correlation with "metropolitanization" among the ten variables.²⁴ Third, there is, however, a remarkable degree of agreement between the two measures of population concentration; in fact, if one ranks the two series of coefficients themselves, they show a rank correlation of $+0.92$ —which tends to confirm the conclusions of Gibbs and Davis regarding the similar results to be gained with various indices of national levels of urbanization.²⁵

The major conclusion to be drawn from these materials, however, is that the usual linkage assumed between industrialization and urbanization—valid though it may be in a gross way—represents a simplistic view. In point of fact, *there are a number of variables that show equivalent degrees of association with urbanization*. This is not a denial of the possibility that many of these other indices are themselves concomitants or consequences of industrialization. It is a plea, however, for the recognition of the many facets of the topic that are likely to be overlooked by focussing exclusive attention upon industrialization in the limited sense of industrial structure. Certainly, other organizational features and technological, environmental and demographic traits as well, warrant attention in any full-scale analysis of the subject.

²⁴ Thomas O. Wilkinson, "Urban Structure and Industrialization," *American Sociological Review*, June 1960, pp. 356-363; see also Jack P. Gibbs and Leo F. Schnore, "Metropolitan Growth: An International Study," *American Journal of Sociology*, September 1960, pp. 160-170.

²⁵ Jack P. Gibbs and Kingsley Davis, "Conventional versus Metropolitan Data in the International Study of Urbanization," *American Sociological Review*, October 1958, pp. 504-514.

B. Measures of Economic Development

Table II presents basic information bearing upon our second major goal—the fuller elucidation of the relationships among the many aspects of economic development represented in our data. It is a complete correlation matrix consisting of 66 rank-order coefficients. The computed values are generally high and positive in direction with the exception of the cells devoted to correlations between national rates of population growth and the other measures. In the case of population growth the coefficients are not only negative in sign (as expected) but also relatively low, ranging from -0.45 down to -0.07 , with the latter value representing the virtual absence of any relationship. The negative direction of these associations was anticipated but the extremely low levels reached by most of the 11 coefficients were actually not expected. In retrospect, however, they are not entirely surprising in view of the radical and unpredicted changes in vital rates experienced in recent years, with soaring birth rates in the West and plummeting death rates in many underdeveloped areas.

Space limitations prohibit a detailed discussion of all of the other interrelations shown in Table II. Throughout the balance of the matrix, however, the coefficients are substantial, ranging from $+0.53$ to $+0.92$ in value. A clear majority (35 out of 55) of these positive coefficients are above $+0.70$, a level that "accounts for" almost half the variation in one factor in terms of another. Only two of them, however, are above $+0.90$, where roughly 80 percent of the variability in one item can be statistically attributed to another. It should be mentioned at this point that there is a positive correlation ($+0.45$) between the size of the correla-

TABLE II—CORRELATION MATRIX: SPEARMAN RANK-CORRELATION COEFFICIENTS,
TWELVE MEASURES OF URBANIZATION AND MODERNIZATION: CIRCA 1950-1955

Variable	Variable Number: *											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Energy consumption .....		.85	.92	.80	.66	.78	.82	.84	-.45	.64	.84	.83
(2) Motor vehicles	65		.78	.81	.81	.79	.70	.69	-.41	.41	.74	.80
(3) Newspaper circulation	74	68		.74	.69	.76	.84	.91	-.45	.60	.82	.82
(4) Non-extractive industry	70	64	70		.64	.71	.72	.73	-.39	.68	.77	.87
(5) International trade	64	64	65	60		.76	.53	.62	-.36	.32	.55	.63
(6) Income per capita	55	51	55	55	50		.74	.67	-.07	.60	.69	.74
(7) Physicians per capita	70	65	70	65	62	53		.85	-.38	.66	.78	.81
(8) Literacy level	73	68	74	69	65	54	70		-.45	.58	.73	.76
(9) Population growth	67	62	68	64	60	53	65	68		-.27	-.21	-.24
(10) Age composition	63	61	63	62	57	51	60	63	60		.56	.52
(11) Urbanization	72	67	73	69	65	54	68	73	67	62		.89
(12) Metropolitanization	73	67	74	69	64	54	69	73	67	63	72	

* Above the diagonal, Spearman rank-correlation coefficient; below the diagonal, the number of cases upon which the correlation in question is based.

tion coefficient and the number of cases upon which it is based; this suggests that the correlations shown in Table II might be even higher if complete geographic coverage were possible.

Cursory examination of Table II will also show that the very first factor listed—per capita energy consumption—reveals the highest average correlation with all other variables. The median and mean (disregarding signs) are shown for each variable in Table III. These averages may be thought to yield a rough indication of the general "importance" of each variable with respect to all of the others. However, no special significance should be attributed to this ordering on the basis of this evidence alone; the relative weights to be assigned the various measures are more efficiently and more correctly determined by other techniques.

The products of one such subsidiary technique are displayed in Table IV where the results of a factor analysis are summarized. The purposes of this phase of the study were two-fold: (1) to deter-

mine whether or not the correlations among these measures reflect some underlying structure and (2), if so, to learn how much of the variation in each measure may be attributed to this more fundamental structure. Factor analysis seems

TABLE III—AVERAGE RANK-CORRELATION COEFFICIENTS, EACH VARIABLE WITH ALL OTHERS *

Variable	Median Coefficient	Mean Coefficient
1. Energy consumption ....	.82	.77
2. Motor vehicles .....	.78	.71
3. Newspaper circulation ..	.78	.76
4. Non-extractive industry ..	.73	.72
5. International trade .....	.63	.60
6. Income per capita .....	.74	.67
7. Physicians per capita ....	.74	.71
8. Literacy level .....	.73	.71
9. Population growth .....	.38	.34
10. Age composition .....	.58	.53
11. Urbanization .....	.74	.69
12. Metropolitanization ....	.80	.72

* Based on Table II.

admirably suited to the accomplishment of these goals. Although this technique has had only limited acceptance in some statistical quarters, it appeared to be most appropriate in this phase of the research.

Cattell and his associates have reported the results of a factor analysis of 72 variables for a sample of 40 "modern industrial nations." In all, twelve factors were isolated by these writers. In their own words, their work "proceeds to inter-correlate a large number of variables and then to resolve them, according to the correlations found, into a comparatively small number of independent factor entities or underlying influences responsible for the correlations."²⁰ This statement is an apt *précis* of the general goals of factor analysis and the present phase of our own research was intended to isolate similar "factor entities" or "dimensions" underlying urbanization and economic development.

The original variables are arrayed in Table IV according to the proportion of the total variance that is explained by the factors isolated; these proportions (h^2) are the summed squares, or communalities, of the factor loadings reported in columns I and II. In most instances, it will be seen that the second factor adds very little to the predictability of the item. For example, the first factor (I) accounts for over 90 percent of the international variation in per capita energy consumption while the second factor (II) explains less than an additional half of one percent. The main exception is to be found in the case of national population growth; it will be recalled that this variable showed moderate to low negative

correlations with the remaining items. The matrix in Table IV reveals that the first factor explains less than 18 percent of the total variation in population growth; the second factor is required in order to raise this proportion to the 30 percent level.

All in all, the factor analysis of these 12 national measures of modernization yields a rather rarely encountered type of finding: an approximation of "unidimensionality." The same fundamental variable would appear to be involved in

TABLE IV—FACTOR MATRIX: FACTOR LOADINGS AND COMMUNALITIES (h^2), ELEVEN MEASURES OF URBANIZATION AND MODERNIZATION *

Variable ¹	Factor loading:		h^2
	I	II	
(1) Energy consumption ..	.95	.07	.91
(3) Newspaper circulation..	.94	.15	.90
(2) Motor vehicles .....	.90	-.24	.87
(7) Physicians per capita ..	.87	.28	.84
(12) Metropolitanization ...	.90	.15	.83
(8) Literacy level .....	.89	.13	.81
(11) Urbanization .....	.86	.26	.81
(4) Non-extractive industry.	.88	-.09	.78
(6) Income per capita ....	.81	.15	.68
(5) International trade ...	.77	-.28	.67
(9) Population growth ....	.42	-.34	.29

* Factored according to the complete centroid method. See L. L. Thurstone, *Multiple-Factor Analysis* (Chicago, Illinois: University of Chicago Press, 1947), pp. 161-170.

¹ The factor analysis did not include (10) age composition, since the data were not assembled at the time.

* Raymond B. Cattell, H. Breul, and H. B. Hartman, "An Attempt at More Refined Definition of the Cultural Dimensions of Syntality in Modern Nations," *American Sociological Review*, August 1952, pp. 408-421.

these ostensibly different indices. In other words, the second (and subsequent) underlying "factor entities" add so little to the prediction of variation in these measures that one could justifiably infer the existence of a single fundamental di-

mension underlying these correlations. One must be wary, of course, of falling victim to the *mystique* that has grown up around the factor-analytic technique. It is perhaps more proper to say that the variables behave *as if* they reflected a fundamental structure. We are not suggesting here that some extremely powerful single factor explains the behavior of all possible measures of development. To do so would be to adopt the error of reifying this "entity" and to lapse into a sophisticated version of the kind of single-factor determinism that characterized the "social science" of an earlier era. Rather, we are pointing to the existence of an extremely close set of *empirical* intercorrelations between these *conceptually* separable aspects of economic development and urbanization.

It will be recalled, of course, that the original intercorrelation matrix (Table II) showed just such an array of strong associations; the factor analysis, then, may appear merely to confirm the inferences based upon examination of the individual intercorrelations. However, the original correlations—in themselves—did not unequivocally point to the unidimensionality indicated by the subsequent factor analysis.

Now in view of this apparent unidimensionality of development and urbanization, it may seem desirable to apply some distinctive label to this underlying dimension. In the opinion of the writer, however, there is little to be gained by such a procedure. Cattell and his associates developed a whole set of rather bizarre designations for the twelve factors isolated in their analysis of 40 nations, including "direct ergic expression," "Classical Patriarchalism versus Uncontrolled Ferment," and "Bourgeois Philistinism versus Improvident Bohemianism." No scientific purpose is

served by such an imaginative exercise in nomenclature. As far as we are concerned, one may designate the primary factor that we have isolated in this study as "modernization" or he may use any other appropriate term that comes to mind. The label is unimportant. *What does matter is the identification of an extremely tight cluster of structured interrelations between various distinct measures of development and urbanization.*

The factor analysis, then, serves not only to verify the earlier results of our simple correlation analysis but also tends to give these findings greater significance. Actually, the most important inference to be drawn from the whole factor analysis has to do with the empirical interrelatedness of these conceptually separable aspects of modernization. In view of our special interest in urbanization, however, the evidence up to this point is also crucial to the extent that it suggests that the process of population concentration is functionally intertwined with development in general. Agglomeration of population is stimulated by industrial transformations (e.g., the shift from primary to secondary and tertiary industries) and by technological changes in the direction of more efficient energy conversion. But in addition, massing in cities permits a higher degree of specialization, external economies, economies of scale, etc. Indeed, *increasing agglomeration of population in large units would seem to be an intrinsic part of general economic advancement.*

C. Variations Within and Between Regions

The last phase of the analysis is summarized in Table V. It is desirable to examine the relationships between the

various measures *within* regions or major continental groupings since the results of world-wide correlations may simply reflect substantial variations *between* regions. We are interested in what may be called "space correlations," i.e., the extent to which areas near each other tend to reveal similar patterns. Whether these apparent similarities are the products of parallel histories, the effects of cultural exchanges through diffusion and migration, or the results of adaptations to similar environments is a moot question. Suffice it to note that a wide range of cultural phenomena, from language through the esoterica of ceremonial practices to complex forms of political organization, often yield the same picture, tending to be more similar over short distances than long. In any event, the previously observed associations between the various measures under study were re-examined within clusters of nations grouped according to sheer physical contiguity. Hopefully, this procedure might afford some additional insights into the nature of the relationships between these multiple aspects of development and urbanization.

The procedure was as follows. In order to avoid duplication of the entire array of 66 intercorrelations for each of six continental groupings—which would require 396 separate computations—we have arbitrarily selected twelve pairs of variables for analysis. These pairs were chosen by reference to the original list of twelve measures in Table II; each item was arbitrarily paired with the next listed item. These pairs are specified in the column headings of Table V and the last row shows the original rank-order coefficients observed for all 75 nations taken together. It will be seen that the original coefficients range from low to high ($-.27$ to $+.89$) and that the overall

distribution is not badly distorted when compared with the total matrix from which these sample pairs were drawn. The six continental groupings and their constituent nations and territories are shown in Table V.

The question at issue is whether the correlations previously observed—without reference to geographic location—tend to increase, to remain substantially the same, or to decrease when they are computed *within* major continental groupings. We are also interested in variations from one region to another, i.e., in the extent to which a particular areal cluster tends to reveal higher or lower correlations.²⁷

Table V contains a rather large amount of information but it can be summarized very briefly. First, less than 30 percent of the comparisons (18 out of 65 correlations within continental groupings) show coefficients with higher values than those originally observed. *This is evidence of a considerable degree of "space correlation."* In other words, it indicates a great deal of homogeneity within regions. *However, this internal homogeneity is more pronounced in some areas than in others.* This can best be shown by indicating for each continental grouping the number of coefficients that are higher or lower than the originally observed values shown in the "total" row of Table V. For this purpose, we have prepared Table VI.

The first two columns of Table VI show that the most "modern" nations—those found in Northern and Western Europe—exhibit the lowest set of corre-

²⁷ This general problem can also be treated in terms of ordinary analysis-of-covariance techniques. This seems to be a case in which the overall (world-wide) relationships are the product of greater "between-group" than "within-group" variance. Our use of rank correlations within regions, in fact, constitutes a rough analysis of covariance.

TABLE V—RANK-CORRELATION COEFFICIENTS, SELECTED PAIRS OF VARIABLES, COMPUTED WITHIN MAJOR CONTINENTAL GROUPINGS

Major Continental Grouping (number of nations)	Energy— Vehicles	Vehicles— Papers	Papers— Industry	Industry— Trade	Trade— Income	Income— Doctors	Doctors— Literacy	Literacy— Growth	Growth— Age	Age— Urban	Urban— Metro	Metro— Energy
Asia (11) .....	.78 *	.77 *	.84 *	.76 ***	.61 *****	.83 ***	.59	.19	.11 *****	.89 *****	.85 *	.82
Africa (14) .....	.77 **	.63 **	.36 *****	a	a	a	.64 ***	a	a	a	.96 *	.79
South America (10) .....	.94	.91	.85	.56	.87 *	.78 *	.81	.22 *	-.17 *	.89	.84	.81
Middle America- Caribbean (11) .	.75	.87	.76	.50 *	.73 *	.72 *	.76	-.02	-.31	-.09	.88	.78
Southern-Eastern Europe (10) ...	.68 ***	.43 ***	.02 *	.96 ***	a	.48 ***	.61	-.47	-.88 **	.98 **	.39	.44
Northern-Western Europe (14) ...	.19 ***	.25 ***	.28	.20 *	.65 **	.10 **	.06 **	-.07	.20	.15	.80	.49
Original coefficients for all nations without regard for continental location .	.85	.78	.74	.64	.76	.74	.85	-.45	-.27	.56	.89	.83

a = insufficient number of cases. The number of cases varies in each row and column; asterisks (*) indicate the number of cases less than the number shown in the continental list in the first column.

Africa: Algeria, Angola, Belgian Congo, Egypt, Ghana, Kenya, Libya, Morocco, Nigeria, Rhodesia-Nyasaland, Sudan, Tanganyika, Tunisia, Union of South Africa. *Asia:* Ceylon, Hong Kong, India, Iraq, Israel, Japan, Malaya, Pakistan, Philippines, Singapore, Thailand. *North America:* Canada, United States. *Middle America-Caribbean:* Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Puerto Rico. *South America:* Argentina, Bolivia, Brazil, British Guiana, Chile, Colombia, Ecuador, Paraguay, Peru, Venezuela. *Southern-Eastern Europe:* Austria, Bulgaria, Greece, Italy, Malta and Gozo, Poland, Portugal, Spain, Turkey, U.S.S.R. *Northern-Western Europe:* Belgium, Denmark, East Germany, England and Wales, Finland, France, Ireland (Eire), Netherlands, Northern Ireland, Norway, Scotland, Sweden, Switzerland, West Germany. *Oceania:* Australia, Hawaii, New Zealand.

lations. In fact, this area's coefficients are uniformly lower than the original values while all of the remaining regions show at least one correlation higher than that initially observed. This indicates that *the Northern and Western European nations are most like each other with respect to these variables. Because of this relative homogeneity, minor variations within a narrow range tend to reduce the rank-order correlations.* In contrast, South America appears as the most heterogeneous continental grouping. Fully half the

correlations among nations within this area are higher than the values originally observed. The same fact is revealed in another guise in the last column of Table VI, where the mean coefficients (disregarding signs) are shown for the various continental groupings.

A final point to be made regarding these correlations has to do with the variables examined. It will be seen that all but two columns in Table V reveal at least one coefficient that is higher than those originally observed (seen in the

"total" row). The two exceptions are the seventh and twelfth columns, the correlations between literacy and the availability of physicians, and between metropolitanization and energy consumption. *It is with respect to these relationships that the "space correlations" are strongest for none of the coefficients computed*

TABLE VI—SUMMARY MEASURES OF VARIABILITY WITHIN MAJOR CONTINENTAL GROUPINGS, PAIRED MEASURES OF URBANIZATION AND MODERNIZATION *

Major Continental Grouping	Number of Coefficients:		
	Higher than Original Values	Lower than Original Values	Average (mean) Coefficient ¹
Asia	4	8	.65
Africa	1	5	.69
South America	6	6	.72
Middle America-Caribbean	3	9	.60
Southern-Eastern Europe	4	7	.58
Northern-Western Europe	0	12	.29
Total	18	47	.58

* Based on Table V.

¹ Signs ignored.

within regions come up to the originally observed levels. Another way of saying the same thing is that these paired variables tend to exhibit the greatest internal homogeneity within clusters of contiguous nations.

What conclusions may be drawn from the foregoing regional analysis? First of all, it should be evident that a considerable degree of "space correlation" may be found, although it varies from area to area and from one variable to another. Secondly, the data from this analysis of relationships within regions suggest that

the homogeneity within these clusters of contiguous nations should not be ignored in any international study. We are unable, of course, to state unequivocally whether or not this internal homogeneity derives from a similar environmental setting. The great topographic and climatic variations to be found within most of these broad areas would suggest that this is not the sole—or even the most important—factor to be considered. Other influences are undoubtedly at work, including the tendency for nearby areas to have had highly similar histories and to have been subject to cultural exchanges through diffusion. Be that as it may, the fact that we are able to demonstrate the operation of "space correlation" has important implications for our entire analysis.

The evidence of area-to-area variation enriches our understanding of the relationships between the variables under study and may even point to new topics for further investigation. For one thing, *the finding to the effect that the most economically advanced area (North-West Europe) is most homogeneous and that the underdeveloped continents are most diverse is not without substantive significance.* Beyond any theoretical meaning that this fact may have, there is one clear practical implication: *every underdeveloped nation has at least one nearby "model" of modernization that may stir envy or emulation.* One need only glance over the basic economic data for continents to see those nations which stand out clearly as pace-setters in their regions—the Union of South Africa and Egypt in Africa; Puerto Rico, Cuba, Panama, and Costa Rica in the Middle Americas and the Caribbean; Argentina and Chile in South America; and Israel and Japan in Asia. These nations make up the vanguard in the backward areas and thus

may deserve particularly close attention from the perspectives of both scientific research and practical policy.

One final observation should be made with respect to the radical variability to be observed in the coefficients reported for various continental groupings. In view of the wide fluctuations observed, the reader might suppose that there is no unique degree of association to be discerned between these variables by means of regression techniques, that the correlations obtained are no more than the fortuitous results of the units selected for observation, and that we have produced meaningless statements of relationship. To adopt such a view, however, would be to display insensitivity to two critical facts, one substantive and one statistical.

First of all, *the very absence of a relationship in one sub-area may be one of the most meaningful substantive findings of all, if it actually reflects near-homogeneity in social and economic characteristics in that area, while others are marked by great internal diversity.* To reject the findings on the basis of area-to-area variation would lead one to miss this potentially important detail. But there is a second and more technical misconception to be avoided. This error is most ably treated by Yule and Kendall in their discussion of "modifiable units," where they deal with any effort "to measure concomitant variation over contiguous regions of space or time." They make it very clear that:

"The magnitude of a correlation will, in general, depend on the unit chosen if that unit is modifiable. Our correlations will accordingly measure the relationship between the variates *for the specified units chosen for the work.* They have no absolute validity independently of these units, but are relative to them. They measure, as it were, not only the variation of the quantities under consideration, but the properties

of the unit-mesh which we have imposed on the system in order to measure it."²⁸

They go on to warn against rejecting the results of inquiries based on correlations using modifiable units and against regarding the coefficients obtained as automatically insignificant. Summing up, they remind us never to lose sight of the prosaic fact that our results depend on our units.

At any rate, the whole issue raised here—whether labeled the problem of "modifiable units" or the phenomenon of "space correlation"—is clearly deserving of much more intensive methodological effort than it has received up to this time. As with the analogous problem of choosing appropriate intervals in time-series analysis, a detailed treatment of the statistical possibilities and limitations of areally-aggregated data would be most welcome. This need is especially urgent in social science where so many relevant data are assembled for national or other political-areal units.²⁹

Summary and Implications

We have demonstrated that the common identification of urbanization and industrialization is woefully incomplete; variations in industrial structure do not tell the whole of the story of population concentration. In fact, the evidence would support equally strongly the view that massing in cities can be attributed to technological progress—in the sense of expansion of the energy base, improvements in transportation and communication, etc.—or to any of a host of other variables. Despite the evidence of a large amount of regional variation the sheer

²⁸ G. Udny Yule and M. G. Kendall, *Introduction to the Theory of Statistics* (New York: Hafner, 1950, 14th ed.), p. 312; italics in original.

²⁹ Otis Dudley Duncan, Raymond P. Cuzzort, and Beverly Duncan, *Statistical Geography* (Glencoe, Illinois: Free Press, 1961).

strength of the global associations between urbanization and many separable aspects of economic development should constitute impressive proof of the complexity of the subject. It is equally imperative, however, to recognize the positive implications of our analysis, and to consider especially carefully the evidence suggesting that urbanization is an intrinsic part of modernization in general.

Yet there are disturbing zones of ambiguity that remain when one attempts to assess the significance of these findings. Some of them stem from the difficulties that attend interpretation of the results of factor analysis—which remains a kind of dead end from a mathematical-statistical point of view as well as from the standpoint of sociological and economic theory. The evidence of “unidimensionality” is a case in point. The identification of a “modernization” syndrome presumably has some value for the student attempting to understand economic development. Yet it may lead to inferences that are unwarranted in the light of other facts. When considering the social and economic transformations that make up development, for example, one may conclude along with Jaffe and Stewart that:

“All of the factors discussed in our matrix must change significantly, and almost simultaneously, or at least with a minimum time lag. The economy needs capital, the introduction of much mechanical energy and modern machines, and scientific procedures. And the human beings to operate these machines must be improved simultaneously. Illiteracy must be wiped out (for an illiterate worker rarely becomes very productive in an industrialized and mechanized society), and the levels of health and physical well-being must be raised considerably if the individual worker's productivity is to rise. (The process is complex; these things

result from industrialization but also are necessary in the process.)”³⁰

If the situation is indeed as complex and ramified as this passage suggests, both theoretical and practical goals may indefinitely elude attainment. The theorist is unable to enter the closed system and the planner has no real chance of breaking the vicious circle. Faced with the image of a whole host of intertwined variables changing simultaneously and in complex interaction, either may be led to desperate stratagems. As Moore has wisely observed:

“In the absence of actual historical data on trends in these indexes, country by country, one may jump to the conclusion that all change together without leads or lags, and that the strategy of modernization requires doing everything at once, or, more logically, of selecting any variable at random as the key to the whole. None of these assumptions squares with our knowledge of the looseness of that functional system we call a society, or the variability of temporal sequences where they are known.”³¹

Moore also cogently states the problem with respect to longitudinal versus cross-sectional analyses, when he points out that:

“Each of the standard devices for historical extrapolation or interpolation of data is beset with hazards. Most of the devices involve reasoning by analogy: supplying the missing figure from regressions established where more indexes are available, or the substitution of cross-sectional comparisons for temporal ones. It is possible, for example, to divide the countries of the world into two or more economic-development cate-

³⁰ *Op. cit.*, pp. 412-413.

³¹ Wilbert E. Moore, “Population and Labor Force in Relation to Economic Growth,” in Simon Kuznets, Wilbert E. Moore, and Joseph J. Spengler (eds.), *Economic Growth: Brazil, India, Japan* (Durham, North Carolina: Duke University Press, 1955), p. 233.

gories and . . . to establish high intercorrelations among available demographic, economic, and social indexes."³²

We have accomplished just this cross-sectional work. What are the implications of this statistical study for current knowledge of urbanization and economic development? First of all, we must explicitly recognize that our results provide no substitute for longitudinal study in historical depth. The examination of more than a few specific temporal sequences is beyond the resources of any individual but we can draw upon the results of many students working on the economic histories of widely separated and currently dissimilar areas. Despite the difficulties that attend the reconciliation of conclusions based on divergent methods there is much to be gained in the process. Since the extant "theory" of urbanization and most models of economic development are longitudinal in orientation it is incumbent upon the empirically-minded student of these topics to adopt research designs converted to the common conceptual coin.

A related point to be made concerns the areal scope of our inquiries. A personal preference for a global approach should not lead one to deny the value of case studies. After all, such studies provide most of our historical information. Perhaps more important, however, is the fact that many of them constitute rich funds of insight into the concrete processes that we hope to describe.³³ Nevertheless, the problems that we aim to elucidate will not be solved piecemeal and there seems to be an important place

for studies aimed at the provision of an overall context.

While we are dealing with the implications of our results for current knowledge of urbanization and economic development, we must point to the fact that we have formulated our research design and conducted our inquiry at a strictly empirical level. This stands in rather stark contrast to the typical economic approach in which abstract models are constructed without much direct reference to empirical parameters. We are not scornful of such efforts; only our own technical ineptitude prevents us from taking a similar course. Moreover, even the most crude empiricist has much to learn from such rigorous analytical efforts as those by Leibenstein and by Haavelmo.³⁴ In point of fact, however, the proximate goal to be sought is a mutual interchange between the representatives of these two approaches; ideally, empirical data of the type considered here will aid the theorist in successively constructing models ever closer to the empirical world, while his abstract analytical models will sensitize the empiricist to new types of relevant information.

It has probably not escaped the attention of the reader that no emphasis has been given here to such traditional topics as savings, investment, capital formation and accumulation, factors that are commonly viewed as the mainsprings of economic development. Aside from limitations of comparative data the major reason for this neglect is the inappropriateness of the cross-sectional methods employed here. Capital formation repre-

³² *Ibid.*

³³ Ansley Coale and Edgar M. Hoover, *Population Growth and Economic Development in Low-Income Countries* (Princeton, New Jersey: Princeton University Press, 1958).

³⁴ Harvey Leibenstein, *Economic Backwardness and Economic Growth: Studies in the Theory of Economic Development* (New York, New York: John Wiley and Sons, 1957); Trygve Haavelmo, *A Study in the Theory of Economic Evolution* (Amsterdam, Holland: North-Holland Publishing Co., 1954).

sents an annual incremental value while most of the variables used here are in the nature of accumulated "stocks;" the latter data are far more amenable to the methodology employed here than are incremental variables.³⁵ Moreover, we have eschewed any invidious comparison of "economic" versus "non-economic" factors in development and urbanization. Although it is true that economists were once disposed either to ignore non-economic factors altogether or to treat them as strictly exogenous variables, recent trends have shifted the balance in the opposite direction at least in the literature on economic development.³⁶ So far has the pendulum swung, in fact, that Spengler was persuaded to entitle a recent essay "Economic Factors in Economic Development."³⁷ Sociologists sometimes claim to be particularly qualified to specify the social and cultural context of economic behavior. Although we are convinced that sociology has much to contribute to economic analysis, the converse is equally apparent.

Surely the largest implications of our work bear upon the mutual relations between these two disciplines—economics and sociology. Deliberately crossing a disciplinary boundary we have invaded

a problem area that is usually regarded as the private preserve of economists. This action should not be misconstrued as an adventure in sociological imperialism although we recognize that we return from the invasion with more than we leave behind. Rather, we are persuaded that the best integration of the two fields is to be accomplished by means of the exchange of ideas and techniques that relate to particular *problems* for analysis.

One could compile with little effort a long list of contact points between sociology and economics. It is sufficient for our purposes, however, to recognize the mutual relevance of interests in "economic development" and "social change," and to appreciate the bearing of economic location theory upon many of the vexing problems that arise in the sociological study of urbanization. Although limitations of space prohibit marshalling the detailed arguments in support of this view we are convinced that the adoption of an "ecological" perspective will yield especially large returns because of its ability to draw upon and accommodate the best of the two disciplinary worlds.³⁸ However, urbanization and economic development are certainly large and complex enough subjects to benefit from more than one mode of analysis. Although the present work is that of an ecologically-oriented sociologist, it is hoped that it will prove to be of some interest and value to other sociologists and economists grappling with the same problems.

³⁵ This is at least part of the explanation of the low correlations between annual population growth and the other indicators. Both Harvey Leibenstein and Otis Dudley Duncan have made this point in personal correspondence. As a consequence, we do not infer that population growth is somehow "unimportant." It may be one of the most important variables of all.

³⁶ Ragnar Nurkse, *Problems of Capital Formation in Underdeveloped Countries* (New York: Oxford University Press, 1953); W. Arthur Lewis, *The Theory of Economic Growth* (London, England: George Allen and Unwin, Ltd., 1955); for a comprehensive bibliography, see Lyle W. Shannon, "Social Factors in Economic Growth," *Current Sociology*, 1957, pp. 173-237.

³⁷ Joseph J. Spengler, "Economic Factors in Economic Development," *American Economic Review*, May 1957, pp. 42-56.

³⁸ Leo F. Schnore, "Social Morphology and Human Ecology," *American Journal of Sociology*, May 1958, pp. 620-634; Otis Dudley Duncan and Leo F. Schnore, "Cultural, Behavioral, and Ecological Perspectives in the Study of Social Organization," *American Journal of Sociology*, September 1959, pp. 132-146.

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The Los Angeles Metropolitan Transit Authority

By DUDLEY F. PEGRUM *

Introduction

LOS ANGELES in one way or another has been struggling with its transportation problems for over thirty-five years. During that time over fifty transit and/or traffic studies have been made, all of them involving a considerable expenditure of funds. Five of the reports recommended the development of rail rapid transit but no public action at any level of government was undertaken to deal with the metropolitan transport problem until 1951 when the state legislature passed a bill entitled, "Los Angeles Metropolitan Transit Authority Act," which was signed into law on July 20, 1951.¹ This legislation established the Los Angeles Metropolitan Transit Authority as a public corporation of the state of California. The scope of its activities, however, was confined to the development of some form of monorail rapid transit for a long but relatively narrow corridor passing through the heart of the city of Los Angeles on routes sanctioned by the California Public Utilities Commission.

It soon became apparent that the Authority was totally incapable of taking any steps to deal with rapid transit for the area. Existing facilities could not be integrated with the proposed monorail. In addition, the engineering firm of Coverdale and Colpitts concluded that monorail would not be feasible unless the Authority were relieved of many of the limitations imposed upon it.² As a con-

sequence, steps were taken by a number of agencies, both public and private, to secure action to remedy the situation. Bills were introduced into the state legislature in 1955 but positive results were not achieved until 1957. In May of that year the second Los Angeles Metropolitan Transit Authority Act³ was signed into law.⁴ This is the basis upon which the Los Angeles Metropolitan Transit Authority now operates.

The Los Angeles Metropolitan Transit Authority Act of 1957

The Act of 1957 was passed to create a special authority to establish a mass rapid transit system within Los Angeles

² Coverdale and Colpitts, *Report to the Los Angeles Metropolitan Transit Authority*, January 15, 1954, states: "If the Monorail is not liable for damages and if the tax assessments and Public Utilities Commission regulation are eliminated, the indications are that the shorter line between North Hollywood and Compton would pay the interest and retire the debt in a period of less than 20 years. This indicates economic feasibility." (p. 70) "The combination of novelty of design, of high taxes shown in this report, subjection of the authority to the Public Utilities Commission and the uncertainty of the assessment of damages for the structure in city streets would, in our opinion, impose a handicap to the sale of these bonds as public revenue bonds. As to this matter the advice of a financial advisor should be sought." (p. 71)

³ *The Los Angeles Metropolitan Transit Authority Act of 1957*, Assembly Bill No. 1104, California Statutes ch. 547, 1957. See *Mirror News*, Los Angeles, California, February 4, 1957, "Sequence of Rapid Transit Development" for a survey of events leading to the legislation.

⁴ The Metropolitan Traffic and Transit Committee of the Los Angeles Chamber of Commerce recommended the establishment of a transit district with power to tax, starting with Los Angeles county, with the approval of the voters, in a step-by-step process to be expanded to include the other areas in the Los Angeles Basin. The committee did not believe that revenue bonds would be able to finance the project. It also opposed a planning commission or transit authority on the grounds that these would not have taxing power.

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¹ Assembly Bill No. 3112, Chapter 1668, Statutes of California, 1951.

County—also designated in the law as the "Metropolitan area." In addition, it repealed the Act of 1951. The Authority was set up as a public corporation of the State of California and the statute specifically stated that it was not a "state agency;" the powers of the Authority were those granted by the Act and were not restricted or qualified by Title 2 of the Government Code. The territorial limits of the Authority were not to be diminished or decreased so long as any bonds issued under the act were outstanding and unpaid.

General Functions of the Authority. The Authority consists of seven members appointed by the Governor, each member to serve for the term of his appointment, the full term being four years. Members must be residents and registered voters in Los Angeles County. Each member is paid \$50 for each meeting of the Authority, but no more than \$200 for any calendar month. No other compensation may be made to an individual for his services as a member of the Authority, although the secretary and the executive director may be members.⁵ The executive director has the responsibility of the management of the properties and business but the Authority may contract with any corporation for the superintendence of the operation and

maintenance of the system or any part thereof. The executive director and general counsel shall not be part of the personnel whose services are supplied under such a contract.⁶ The Authority may adopt whatever rules and regulations it deems advisable with respect to the conduct of its own affairs. It is not subject to the jurisdiction of the Public Utilities Commission of California except that it is required to adopt and comply with safety regulations prescribed by the commission.⁷

In order to carry out its responsibilities for the establishment of a mass rapid transit system the Authority may acquire all the necessary properties of various kinds for this purpose and may enter into agreements with any public utility operating any transportation facilities either within or without the metropolitan area for joint use, or the establishment of through routes, joint fares and transfer of passengers.⁸ It may also obtain for cash or by exchange of its bonds any publicly- or privately-owned bus lines within or without the metropolitan area which may be integrated as feeder services within the system of the Authority.⁹ The latter may exercise the power of eminent domain within the metropolitan area and a resolution by the Authority is conclusive evidence of the public necessity of the proposed acquisition. No publicly-owned property, however, may be taken without the consent of the public agency which owns it nor may any privately-owned public utility be taken or condemned without the consent of such

⁵ *The Los Angeles Metropolitan Transit Authority Act of 1957, op. cit.*, ch. 3, sec. 3.6. The secretary and the executive director are appointed by the Authority. Presumably, they are not to be from the membership appointed by the Governor, nor do they appear to be ex-officio under the law.

⁶ A majority of the members of the Authority constitute a quorum and all actions require a majority vote except that any indenture may require that certain acts require a two-thirds vote of the full number of the members. Presumably, this means that the Authority, at least for these purposes, consists of nine members, otherwise a majority would suffice. *Ibid.*, sec. 3.8.

⁷ *Ibid.*, sec. 3.11. The law does not state how these regulations are to be policed. The Board of Public Utilities of the city of Los Angeles has no jurisdiction over the service of the Metropolitan Transit Authority even though it has such powers with respect to privately-owned utilities.

⁸ Ch. 4, sec. 4.3, 4.4, 4.5.

⁹ *Ibid.*, sec. 4.25

utility.¹⁰ When publicly- or privately-owned public utilities are acquired the Authority is required to assume and observe all existing labor contracts and no employee of any such utility shall suffer any worsening of his wages, seniority, pension, vacation or other benefits by reason of the acquisition. In addition, no merger, consolidation or reduction of lines or services shall take place until adequate provisions have been made for any employees who are or may be displaced or whose wages, hours, place, or conditions of employment are or may be adversely affected.¹¹

Coordination of Passenger Transport.

One of the functions to be performed by the Authority is that of coordinating any of its operations with those of any then existing system and to this end elaborate provisions are set forth governing the establishment of such coordination.¹² If in undertaking the various phases of its operations or development the Authority diverts, lessens or competes for the patronage or revenues of the existing system of a publicly- or privately-owned public utility in the Metropolitan area, the Authority is required to notify the utility of its intentions. No action may be taken by the Authority until 120 days have expired after delivery of the notice. During the intervening period the public utility has the option to require the Authority to purchase that portion of its

system affected by the action of the Metropolitan Transit Authority or to require the Authority to purchase all of the existing system. The purchase price to be paid for the acquisition is the reproduction cost new (including going concern value) less depreciation and in no event less than the average annual gross revenue for the three preceding calendar years. The utility is entitled to severance damages for loss of value of the unsold portion if only part of its system is acquired.

If the system to be acquired is a publicly-owned utility or if the operations of the publicly-owned utility are adversely affected by the expansion of the Authority, then the latter must submit to the legislative body in charge of the publicly-owned system a written detailed statement covering the proposed plan. The public corporation must then hold public hearings and, if sale of all or part of the system is involved, the proposal must be submitted to a vote of the electors. If the vote is favorable, the acquisition will then follow the procedures set forth for privately-owned utilities.¹³

When an existing privately-owned system or any portion of one is acquired, the Authority may pay in lieu taxes to the public corporation previously receiving such taxes. The amount may not exceed that which was paid theretofore. The law contains no compulsion, however, and whether such taxes are paid is a matter of option on the part of the Authority, at most.¹⁴

¹⁰ *Ibid.*, sec. 4.6 and 4.7.

¹¹ Ch. 3, sec. 3.6 (e) and (f): the Authority may also provide for a civil service or retirement or both for any or all employees. Ch. 4, sec. 4.24: the law also states that the Authority shall not discontinue or abandon transit services on any route of any publicly- or privately-owned utilities acquired by the Authority except upon substitution of equal services without cost to the taxpayer. Ch. 6, sec. 6.11: to put it mildly, the meaning of this is anything but clear.

¹² Ch. 4, sec. 4.21.

¹³ *Ibid.* Presumably, only a majority of the votes cast is necessary to decide the issue since the law is silent on this matter.

¹⁴ C. C. Kelley, general counsel for the Metropolitan Transit Authority has expressed the opinion that in lieu payments would constitute a gift and such action is illegal under the state constitution. *Los Angeles Examiner*, August 22, 1958.

When any existing system or portion thereof is acquired by the Metropolitan Transit Authority, the latter may continue to operate the property, with regard to streets and so forth, in the same manner that obtained theretofore. However, no new construction of "subways, elevated railways, overhead suspended transit, or any other structures constituting a method of mass rapid transit in, upon, over, under or across public streets, highways, freeways, and other public places [may be undertaken] without the consent of the city, county or State having jurisdiction over such street, highway, freeway, or other public place."¹⁵ This obviously creates some interesting implications with regard to the establishing of a mass transit system for the area.

Financing the Undertakings. The Authority is given the power to issue revenue bonds to provide the capital necessary to finance the rapid transit system.¹⁶ All bonds issued must contain a recital on their face that neither the payment of the principal nor the interest shall constitute a debt, liability or obligation of any county or city or the state.¹⁷ Moreover, all bonds and the interest or income therefrom are exempt from all taxation in California other than gift, inheritance and estate taxes.¹⁸ Any indenture may also contain a clause limiting the power of the Metropolitan Transit Authority to issue additional bonds for the purpose of acquiring, constructing or completing the system or any part thereof.¹⁹ The bonds shall bear interest at a rate not to exceed six percent per annum, payable annually or

semiannually, and this rate applies to the yield.²⁰ The maximum rate of maturity is 50 years.²¹

The Authority is given the power to fix rates, fares, tolls, charges, rents or other charges for the use of the system.²² There is no provision regarding notice for changes in these charges and the Public Utilities Commission of California exercises no control whatsoever. The discretion of the Authority, however, may be "subject to such contractual obligations as may be entered into by the Authority and the holders of the revenue bonds issued under this act" and the Authority may provide that the rates are minimum rates subject to increase or decrease only in accordance with the terms of the indenture under which the revenue bonds are issued.²³

The state or any public corporation may make public contributions to the Metropolitan Transit Authority with the sanction of the appropriate legislative body. However, after the revenue bonds have been issued no public corporation shall make any public contributions in any way unless a proposition to do so has been approved by a majority of the registered voters residing within the boundaries of the public corporation at an election conducted for that purpose.²⁴

Finally, where economic-engineering studies show that there is a need for public transit in specific areas but feasibility studies do not indicate sufficient income to support the required financing by revenue bonds, the Authority in cooperation with public agencies in the

¹⁵ Ch. 4, sec. 4.8.

¹⁶ Ch. 5, sec. 5.1.

¹⁷ *Ibid.*, sec. 5.4.

¹⁸ *Ibid.*, sec. 5.37.

¹⁹ *Ibid.*, sec. 5.17.

²⁰ *Ibid.*, sec. 5.27 and sec. 5.32.

²¹ *Ibid.*, sec. 5.31.

²² Ch. 4, sec. 4.9.

²³ Ch. 7, sec. 7.1.

²⁴ Ch. 9, sec. 9.3 and sec. 9.6. In the case of general obligation bonds a two-thirds favorable vote must be cast.

area is to determine the boundaries of a transit district within the Los Angeles metropolitan area. Such a district may be created with powers provided by voters for the taxation of property and the financing of the system through general obligation bonds. The district may operate the facilities independently for the benefit of the people of the district or by contract with the Metropolitan Transit Authority for coordinated and integrated operation.²⁵ This evidently means that a monorail rapid transit system can be established under public ownership, within the area of the Metropolitan Transit Authority to be operated independently of the latter or even, through agreement, by the Metropolitan Transit Authority itself.²⁶ Of course, the Metropolitan Transit Authority would not have to assume any of the obligations of such a rapid transit system.

The Authority in Action. The Los Angeles Metropolitan Transit Authority became an effective operating company on March 3, 1958 when its issue of \$40 millions of revenue bonds was sold. With these funds the corporation was able to purchase the Los Angeles Transit Lines for \$21,604,000 and the Metropolitan Coach Lines and its subsidiary the Asbury Rapid Transit System for \$13,596,374, a total of \$35,200,374.²⁷ At

the present time the Authority operates 1,890 miles of regularly scheduled routes; in addition it provides a limited-stop service by "Freeway Flyers" between downtown Los Angeles and places within and outside of Los Angeles county including Disneyland, Knott's Berry Farm and various race tracks during the racing season.²⁸ It has, however, refused to take over bus line operations in the city of San Bernardino, which is outside of Los Angeles county, on the grounds that providing bus transportation in that city is feasible only if there is a subsidy of some kind.²⁹

Although the Act of 1957 contemplates that there shall be a single integrated system of public transportation for passengers in Los Angeles county, it recognized that for some time to come there will be both publicly-owned and privately-owned public passenger transport undertakings. Moreover, as was pointed out earlier in this article, the law contains express conditions as to the procedures which must be employed to accomplish the coordination. Whether such total unification can ever be effectuated under the existing law remains to be seen. In any case, there is still the question of providing necessary services in various places which the Metropolitan Transit Authority does not offer at the present time.

This issue came to the fore in an application of the Charter Bus Transportation Company before the Public Utilities Commission. The company

²⁵ Ch. 11, sec. 11.2.

²⁶ Gerald Kelley, general counsel for the Authority has pointed out that it cannot grant a franchise to a private corporation to operate a mass rapid transit system. (*Los Angeles Times*, September 11, 1959.) However, a mass rapid transit district may be formed under public ownership and operated independently of the Authority if the voters consent.

²⁷ Mimeographed report issued by Authority, September 28, 1950. This was determined by cost of reproduction new less depreciation. *Annual Report, Metropolitan Transit Authority*, December, 1958. This figure may be compared with the rate-base (value for rate-making) of \$26,730,000 submitted by the Los Angeles Transit Lines and the Metropolitan Coach Lines in their application to the California Public Utilities Commission for an

increase in fares in July 1957. Obviously, the purchase price was considerably larger than any figure upon which the privately-owned lines would have been permitted to earn a fair return.

²⁸ *Metropolitan Transit Authority Newsletter*, June-July 1959.

²⁹ Statement of Max Gilliss in *Los Angeles Times*, November 27, 1959.

rendered seasonal services to Santa Anita, Hollywood Park and Los Alamitos; it requested authorization to offer similar services to the Los Angeles Dodgers Baseball Club from a large number of cities in Los Angeles county. The routes and services overlapped and paralleled existing routes of the Metropolitan Transit Authority and some other transit lines. However, none of the protestants provided the proposed type of direct round-trip service. The Commission granted the certificate on August 5, 1958. The Metropolitan Transit Authority appealed the Commission's ruling to the State Supreme Court. The latter first set aside the order of the Commission but on rehearing it reversed its previous ruling and affirmed the order of the Commission.³⁰ The Court held that the Commission had the power to grant permission to private utilities to provide transport services where public necessity and convenience required although it was to be assumed that the Commission would give heed to the Act of 1957 so that its authorizations would not impede the growth of the Metropolitan Transit Authority's system.

The Los Angeles Metropolitan Transit Authority and the Los Angeles Metropolitan Passenger Traffic Problem

Can the Authority Fulfill its Purpose?

The foregoing survey of the Los Angeles Metropolitan Transit Authority and the legislative basis upon which it is constituted raises a series of questions concerning the ability of the agency to deal

with the problem of moving people in the Los Angeles area, to say nothing of the relation of it to the over-all issue of transport and transport facilities for the region. Is it a rapid transit authority and can it, within the present statutory framework, provide rapid transit in the usual meaning of that term? Is it set up so that it can provide for a coordinated system of rapid transit and other facilities for the movement of passengers in the region? Has there been any real change or is there the basis for any real change in the situation which existed prior to the acquisition of the private transport undertakings?

To whom is the Authority answerable for the discharge of its functions under the law and is it in fact so constituted as to insure operation in the public interest? Is there any likelihood that the Authority can make an appreciable contribution towards developing public passenger transport facilities superior to those provided by the former private owners and at no greater cost to the general public than previously?

These and other similar questions emerge because of the peculiar constitution of the Authority, the sweeping powers which it enjoys, and the severe limitations imposed upon its activities by the legislation and by the restrictions on its future activities resulting from the conditions relating to the acquisition of the Los Angeles Transit Lines and the Metropolitan Coach Lines. The Act of 1957 is so full of contradictions and omissions and the scope of the powers given to the members of the Authority so great that it is scarcely possible to present an accurate description of the agency and an appraisal of its potentialities without inviting contradiction and probably severe criticism on grounds of inaccuracy.³¹ In other words, the legisla-

³⁰ *Los Angeles Metropolitan Transit Authority vs. Public Utilities Commission of the State of California*, 343 P. 2d 913 (1959), reversing on rehearing 339 P. 2d 129 (1959).

tion is badly written from the standpoint of the problem with which the public had every reason to believe it was supposed to deal—whatever may have been the advantages to the owners of the properties which the Authority acquired.

The statute under which the Los Angeles Metropolitan Transit Authority operates cannot be characterized as a comprehensive and coherent piece of legislation for rapid transit planning and development. The territorial scope of the undertaking is limited to Los Angeles county, certainly insofar as any rail rapid transit is concerned. Thus, rapid transit for the metropolitan area that falls outside the boundaries of the county cannot be constructed by the Metropolitan Transit Authority as presently constituted. Furthermore, any development of rapid transit that involves construction that passes over or under public property necessitates the sanction of the public authority governing the property where the passage takes place. Comprehensive planning for rapid transit obviously is going to require cooperation with more than just the governments of the city of Los Angeles and Los Angeles county. There is the additional fact that any bond indenture may contain provisions which prevent the Authority from embarking upon any arrangements or entering into any agree-

ments which impair or impede the operations necessary to produce adequate revenues. Nor, may additional bonds be issued for the purpose of acquiring, constructing or completing the system, or any part thereof, if the existing indentures prevent it.³² Indeed, the powers given the Metropolitan Transit Authority with regard to the issuance of revenue bonds and the conditions which the indentures may contain are such, it would appear, as to subject it to the total and immediate control of the bondholders.³³ It is obvious that nothing will be done by the Authority that will impair their existing position and presumably even the state legislature cannot amend the law in a way that will do the same thing.

From this emerges the inescapable conclusion that, despite the expensive studies being made by it for rapid transit, especially monorail, the present Authority is most unlikely to embark upon any such undertaking. The prospects of such a system that could pay its way in keeping with the prescriptions under which the Authority is now operating seem to be nil. Over-all coordination of passenger transport for the Los Angeles Metropolitan Area, which was the expressed objective of the Act of 1957, seems to be beyond the realm of realization within the framework of the present legislation.³⁴

³² For example, the Authority was set up to deal with rapid transit within Los Angeles County and the members of the Authority must all be residents and registered voters in the county, yet the corporation operates busses (the Freeway Flyers) all the way to San Bernardino. It rejected the request of the City of San Bernardino to take over bus line operations (privately-owned) in that city on the ground that they could be operated only at a loss. Then, too, although the Authority is free from any outside control, it is limited through legislative prescription, in future actions by virtue of its bond financing and may be further limited by conditions included in the bond indentures imposed upon the Authority by itself.

³³ Ch. 5, sec. 5.13 and 5.17.

³⁴ It is clear that the condition contained in the indentures are as restrictive with regard to the provisions necessary to protect the position of the bondholders as the law permits. One may venture the opinion that the general public is the only real victim, so far as protection is concerned, under this statute.

³⁵ The timetable for the development of a rapid transit system when the discussion of Assembly Bill 1104 (1957) was taking place as was given by Ralph Merritt was as follows: purchase of the Los Angeles Transit Lines by December 31, 1957; comple-

Evaluation of the Metropolitan Transit Authority. The Act of 1957 specifically exempts the Authority from any control whatsoever by the Public Utilities Commission of California nor is there any substitution of other control to take its place. The law contains no provision for the removal of members once they have been appointed to the board; they are not required to issue reports concerning the operation of the system to any public authority; they are directly answerable for their actions to no legislative or administrative body nor to an electorate; and they are limited only by their own judgment and the contracts with the bondholders in the exercise of the wide discretionary powers conferred by the statute. They may fix rates as they see fit and change them without notice or hearing and there are no standards of service or requirements in the legislation with regard to extensions, development or coordination. The only limiting conditions in this connection appear to be in the bond indentures (which were agreed to by the Authority using its own discretion) or conditions of the sale of the bonds for securing the funds for the acquisition of the private lines.

The law permits payments in lieu of taxes and franchise fees, but there is no compulsion, and the general counsel for the Authority, as already noted, has stated that such payments would in his

opinion be illegal under the state constitution. The city attorney for Los Angeles reported to the city council that according to his estimates there would be a loss of \$3,035,530 in city, county, state and federal taxes annually as a result of the acquisition of the private lines.³⁵ In addition, the bonds and all income therefrom are exempt from all taxation in California other than gift inheritance or estate taxes. Whatever the total tax loss to the various governmental agencies may be, these, together with the increase in fares that have been instituted must be matched against the alleged benefits the local traveling public has received as a result of the operation of the Authority.

Although it must be recognized that the Authority has been operating for only three years and therefore can scarcely be appraised on accomplishment or lack of it, nevertheless it is reasonable to raise a question concerning what it has done and what it is likely to do. It is not apparent that there has been any change of significance to the patrons in the operation of the lines taken over by the Authority and certainly none worth the cost that this has entailed to the taxpayers to date. That the future operation of the bus lines will offer advantages and services that private ownership could not provide may be doubted but in any case this was not the purpose for which the Authority was created.

So far, the development of plans for rapid transit has not proceeded to the stage of the form which it may take—let alone routes, costs, financing, even feasi-

tion of the first rapid transit studies by December 31, 1958; construction of the first 40 miles of rail line between the San Fernando Valley and Long Beach and the completion of additional studies in 1959. (*Los Angeles Times*, March 15, 1957.) Perhaps the *Los Angeles Times* was right when, commenting in an editorial on the proposed legislation of 1955 (S. 1308) it said that the Los Angeles Metropolitan Transit Authority may not be—yet the grand design seems to be—a device for facilitating the building of monorail lines. (*Los Angeles Times*, May 4, 1955.)

³⁵ *Herald-Express*, May 13, 1955. Total taxes paid by the Los Angeles Transit Lines, the Metropolitan Coach Lines and the Asbury Rapid Transit System (exclusive of social security taxes) for the calendar year 1957 were reported to the Public Utilities Commission as amounting to \$3,694,423.

bility, and so forth. The most that has emerged to date is drawing-board projections and artists' sketches of monorail facilities. More important, however, is the fact that when engineering plans have crystallized to the point that concrete proposals are presented to the public, there appears to be no possibility of putting them into operation within the present framework of the Authority.

Conclusion

At the present time there appears to be almost a total lack of a concept of a master plan for passenger traffic and the coordination of passenger transport and rapid transit for the Los Angeles Metropolitan area. In light of the present legislation and the conditions surrounding the acquisition of the properties operated by the Authority, it is very doubtful that a system of mass rapid transit can be established without additional action on the part of the state legislature. Even that would appear to face real obstacles. It does not seem to be too rash to assume that mass rapid transit comprising any form of rail transport would require the

establishment of a separate and independent agency. This might also present severe, if not insurmountable, difficulties because of the possible impact of the new transport facilities on the revenues and position of the present Metropolitan Transit Authority.

These difficulties could be overcome by legislation which would transfer the responsibility for the obligations already incurred to the new agency with full responsibility for those obligations being assumed by the new agency with public guarantee of them. In other words, those who have financed the present Authority seem to be in the position of being assured that nothing can be done to impair their present position, so far as the development of mass rapid transit is concerned. The Authority is not obligated to develop mass transit if the present controlling interests do not see fit to do so and legislation that aimed at creating a rival enterprise to accomplish this would encounter severe legal obstacles. What this augurs for the moving of people in the metropolitan area by public transport may well be a cause for real public concern!

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ARTICLES

- A Theory of Economic Development *Gustav Ranis and J. C. H. Fei*
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Welfare Criteria for External Effects *E. J. Mishan*
Stochastic Reserve Losses and Bank Credit ... *Daniel Orr and W. J. Mellon*
The American Political Economy Club *A. W. Coats*

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The Bethlehem-Youngstown Case *L. S. Keyes*
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Reports and Comments

The Nez Perce Dam and the Value of a Fishery†

IN THE COURSE of the difficult and long-standing conflict between hydropower development and preservation of salmon runs in the Pacific Northwest, a clear-cut policy of incurring sizable costs to preserve the salmon runs has evolved.¹ There is widespread public support for this policy. It stems from the commercial and recreational importance of the salmon fishery, a general feeling of "moral priority" based on the fact that the fishing industry pre-dates the power industry, and the threat of complete and irrevocable extinction of an important and fascinating resource. Most people, it seems, are willing to spend money to save the salmon: the question is how much are they willing to spend. The willingness to spend, of course, reflects the value attached to the resource. The value of the resource cannot be measured directly because much of its importance derives from non-monetary and extra-market considerations.²

An opportunity to impute a value attached by society to the preservation of the salmon resource is provided by the *Nez Perce vs. High Mountain Sheep* case. The Federal Power Commission is currently considering applications for development of the Nez Perce project proposed by the Washington Public Power Supply System and the High Mountain Sheep project proposed by the Pacific Northwest Power Com-

pany. The two projects are mutually exclusive.³

Nez Perce is shown to be an apparently superior project except that it blocks the salmon (and steelhead) runs of both the Snake and Salmon Rivers. The High Mountain Sheep project would block only the Snake River runs which are smaller than the Salmon River runs. Both the Corps of Engineers and the Federal Power Commission have recognized the superiority of the Nez Perce project apart from the question of the salmon runs.⁴ A decision in favor of High Mountain Sheep, therefore, would indicate the importance attached to fish preservation and at least a minimum evaluation of this importance can be derived from the difference in the costs of the two projects. A benefit-cost analysis of the two projects is presented in the Corps of Engineers *Review Report of 1958* and the comparison presented below is based on this report.⁵

¹ The Washington Public Power Supply System is an organization composed of thirteen Washington Public Utility Districts. The Pacific Northwest Power Company is composed of the following power companies: Portland General Electric, Pacific Power and Light, Washington Water Power and Montana Power. For a description of the case and views of the contending parties see Harold Hughes, "Fish Group Criticizes High Snake River Dam but Says Mountain Sheep Plan 'Best' of Evil," *The Oregonian*, Portland, Oregon, June 16, 1960.

² For a complete description and an analysis of the Nez Perce, High Mountain Sheep, and Lower Canyon Projects see United States Corps of Engineers, *Water Resource Development: Columbia River Basin*, Portland, Oregon, June 1958. Hereafter referred to as the 531 Review Report. See also, United States Federal Power Commission, *Staff Brief* (Washington, D. C.) March 15, 1957.

³ The preliminary data presented by the two applicants, the Washington Public Power Supply System and the Pacific Northwest Power Company, differ somewhat from the project data used by the Corps of Engineers. The latter data are used here, however, because they are based on the same planning criteria for both projects and because the data available from the applicants are presumably subject to change in the course of the hearing now underway before the Federal Power Commission.

† The authors are indebted to Dr. J. V. Krutilla of Resources for the Future, Inc. for calling this topic to their attention.

¹ For a survey of the fish-power problem in the Pacific Northwest, see M. E. Marts and W. R. D. Sewell, "The Conflict Between Fish and Power Resources in the Pacific Northwest," *Annals of the Association of American Geographers*, March 1960, No. 1, pages 42-50. See also, Anthony Netboy, *Salmon of the Pacific Northwest* (Portland, Oregon: Binfords and Mort, 1958).

² M. E. Marts and W. R. D. Sewell, "The Application of Benefit-Cost Analysis to Fish Preservation Expenditures: A Neglected Aspect of River Basin Investment Decisions," *Land Economics*, February 1959, pp. 48-56.

Comparison of the Alternatives

The Nez Perce project would be located on the Snake River, 2.5 miles from its confluence with the Salmon River. The proposed 700-foot dam would create a reservoir to store 4.5 million acre-feet of water for power and flood control purposes. The powerhouse would have an installed capacity of 1.2 million Kw.

The Nez Perce dam, as noted, however, would block one of the largest remaining salmon runs in the United States, the Salmon River run, as well as runs on the Snake River. Of the estimated 327,000 adult salmon which migrate up the Snake River, about 238,000 pass the Nez Perce site and 170,000 of the latter ascend the Salmon River.⁶ Although fish passage facilities have been proposed the fishery interests are skeptical of the possibilities of their success.

To preserve the Salmon River run the Nez Perce project has been figuratively divided into two projects, one a short distance upstream on the Snake River and the other close to the confluence of the Snake and Sal-

mon Rivers. The one on the Snake—High Mountain Sheep—would be built now and the more modest Snake River run passing the site (about 51,000 adults) would be gambled. The dam on the Salmon River, Lower Canyon, would be deferred until there was assurance that migrating fish could pass or be carried around the dam.

Together, the plans for High Mountain Sheep and Lower Canyon projects provide approximately the same power output and storage as considered for the Nez Perce project. But there is a tremendous difference in the costs. The Corps of Engineers estimated that Nez Perce would cost \$285 millions compared with \$420 millions for the 2-dam plan (Table I).

Costs of Saving the Salmon

If the decision should be in favor of the two-dam plan, three fish preservation costs would be associated with the decision. (1) "Specific" costs of fish preservation involved at-site. Such costs include costs of fish collection and passing facilities, hatcheries, and of investigations. (They might also include the value of power lost as a result of water released for fish ladders but this value is not estimated in the Corps of

⁶ United States Corps of Engineers, *op. cit.*, Vol. IV, Part 3, p. 68.

TABLE I—COMPARISON OF FEATURES AND COSTS OF NEZ PERCE AND HIGH MOUNTAIN SHEEP—LOWER CANYON PROJECTS¹

Item	Unit	Nez Perce	TWO-DAM PLAN		
			High Mountain Sheep	Lower Canyon	Total
Usable Storage	Million Acre Feet	4.5	2.1	2.5	4.6
Initial Power Capacity	KW	1.2	0.6	0.6	1.2
Costs:					
Construction	\$ Million	284.8	226.3	194.5	420.9
Annual	\$ Million	13.7	10.5	9.3	19.9
Benefits:					
Flood Control	\$ Million	5.9	1.8	3.4	5.2
Power	\$ Million	38.1	22.7	16.4	39.1
Recreation	\$ Million	.1	— ²	.1	.1
TOTAL	\$ Million	44.1	24.5	19.9	44.4
B-C Ratio		3.21	2.33	2.14	2.24

¹ Source: United States Corps of Engineers, *Water Resource Development, Columbia River Basin, Portland, Oregon*, June 1958, Vols. I and V.

² Estimated at \$16,000 per annum.

TABLE II—COSTS OF FISH AND WILDLIFE PRESERVATION AT NEZ PERCE HIGH MOUNTAIN SHEEP AND LOWER CANYON PROJECTS¹

Item	Nez Perce	High Mountain Sheep	Lower Canyon	TOTAL Two Dam Plan
Fish collection, handling and passage facilities	8,000,000	4,000,000	8,000,000	12,000,000
Contingencies	4,000,000	600,000	4,000,000	4,600,000
Investigations	120,000	130,000	120,000	250,000
Land requirements, range restoration, supplemental spawning, etc.	420,000	430,000	320,000	750,000
Total Cost—Fish and Wildlife ...	12,540,000	5,160,000	12,440,000	17,600,000
TOTAL PROJECT COSTS	284,820,000	226,380,000	194,550,000	420,930,000

¹Source: United States Corps of Engineers, *Water Resource Development, Columbia River Basin*, Volume 5, Portland, Oregon, June 1958. No detailed breakdown is available of costs associated with fish preservation as distinct from wildlife preservation. However, the largest expenditures are associated with fish.

Engineers report.) The specific costs are estimated at \$17,600,000 (Table II). (2) *The cost of substituting the two-dam plan for the Nez Perce project clearly reflecting a decision to preserve the Salmon River runs.* This "cost of substitution" amounts to \$131 million, after netting out the cost of passage facilities from the gross difference in costs (cited above) between the two alternative plans. (3) *Downstream costs of preservation necessary to ensure the runs reach the High Mountain Sheep and Lower Canyon sites.* These costs include part of the specific at-site costs at dams already built and at dams planned for construction on the Columbia and Snake Rivers. There are, however, severe difficulties involved in identifying and measuring these downstream costs. They are dynamic in nature, changing with each project added to the system. It is clear, however, that a decision to preserve fish at any of the Middle Snake dams presupposes that facilities will be placed at all future dams downstream. This implication assumes particular importance when it is remembered that over \$200 million has been invested already in fish preservation facilities on the Columbia River.⁷

Thus the cost of fish preservation associated with the two-dam plan would total \$148 million plus a share of downstream costs. Given such a decision, this figure can

be regarded as the value placed by society on preservation of the Salmon River fishery resource.

Implications

The major implication of such a decision would be that society is willing to place a very large value on the salmon, well above that indicated by commercial or market-value considerations. The average annual value of the salmon catch (both sport and commercial) of the entire Columbia River basin has been estimated at \$17 million.⁸

It is also interesting to note that a decision in favor of the two-dam plan would imply a willingness to have fish *in the future* rather than low (lower) cost power *in the present*. It involves a resource choice

⁷ Costs of fish facilities at eight federal dams on the main stem of the Columbia River have been estimated to amount to \$156 million. Costs at Priest Rapids will be about \$10 million, and at Rocky Reach about \$9 million. Added to these are costs of operating and maintaining the facilities and costs of research. Netboy has suggested that costs of fish preservation on the Columbia River have already exceeded \$200 millions. See A. Netboy, *op. cit.*, p. 112.

⁸ United States Corps of Engineers, *op. cit.*, Vol. IV, Part 3, p. 9.

over time based in large measure on social and aesthetic values and suggests a serious understatement of such values in conventional economic analyses.

The decision also suggests that society is willing to pay a high price to be conservative about currently available fish preservation techniques and to gamble that satisfactory means of passing fish will be available by the time the construction of the Lower Canyon project is required. It also implies that if such means are not found and some other storage opportunity has to be developed, even higher costs of salmon preservation will be involved.

The cumulative impact of such decisions, of course, enhances the importance of the Canadian storage possibilities in the Columbia River basin (now under active consideration by the two governments) and hastens the day when the Pacific Northwest power supply system will be dependent on thermal power for base loading. The Nez Perce case affords another illustration, simi-

lar to that of the Hells Canyon Dam controversy of ten years ago, of the difficulty of carrying out comprehensive, basin-wide power programs where important institutional and resource conflicts are involved and where the planning proceeds without reconciliation of these conflicts.⁹

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⁹ John V. Krutilla and Otto Eckstein, *Multiple Purpose River Development* (Baltimore, Maryland: Johns Hopkins Press, 1959). See also, M. E. Marts, "Upstream Storage Problems in Columbia River Power Development," *Annals of the Association of American Geographers*, March 1954, 43-50; and "Water Resource Policy Implications of the Hells Canyon Controversy," *Yearbook of the Association of Pacific Coast Geographers*, Vol. 15 (1953), pp. 32-37.

The Dilemma Of Urban Planning

THE TREND OF LIVING PATTERNS in the United States is moving unmistakably toward further urbanization. Virtually all prognosticators agree this trend will tend to increase in momentum as metropolitan areas continue to grow in area and swell with expanding population concentrations. Therefore, the great peril posed by uncontrolled urban growth, occurring primarily in suburban areas surrounding the urban core, is not one of urban destruction for few facets of twentieth-century life seem as predestined as the further urbanization of this country. There is, however, grave danger that the city center as we know it today will be forced to surrender its present paramount position and become a subsidiary service area lying between many satellite urban-suburban communities.

The Dilemma of Decentralization

The prevailing myth of the separability of urbanites and suburbanites into two distinct groups with divergent and dissimilar problems is of course a totally unrealistic, but nevertheless apparent public misconception. Constantly rising property taxes are a very significant manifestation of the press of suburban populations on streets, utilities, schools and other municipally-supported facilities. Further, suburban expansion is threatening the existence of the prime promulgator of suburbia—the concept of "living in the country"—as subdivisions gobble up the rapidly dwindling supply of suburban greenery. Thus, the suburban community is faced with a dilemma

which in many ways resembles that of the city center.

The dilemma of the city center may be illustrated thus: In order to progress in an economically healthy fashion the city must retain the wealth it now possesses and at the same time woo back the wealth it has lost. Stating the proposition in different words, the city center must add dollars without intensifying its already severe congestion problems. Obviously, attainment of this objective presents a very real dilemma and the severity of the situation is intensified by the fact that the dilemma must be studied, analyzed and *solved* if the city is to prosper as it must do in order to survive.

In many ways decentralization holds promise of better functional arrangements of urban population and employment if a proper relationship is created and maintained between the city center and the outlying sub-centers. However, present trends indicate this balance will not be established until the urban center corrects some of its primary faults for any solution to the urban dilemma must embrace the taking of a positive course of action toward the abatement and eventual extinction of several predominant and undesirable city center characteristics. A partial listing of these factors would include the prevalence of slums; air pollution particularly in highly industrialized urban centers; inadequate parking facilities downtown; outmoded, congested traffic arteries into, out of, and within the central business district; and inadequate, inefficient mass-transportation systems.

Defining the Problem

City planners, municipal officials, civic and business organizations and other advocates of urban rejuvenation recognize the necessity of attacking these problems on a comprehensive basis. In their earnest desire to redo the city, however, the planners seem to be caught between the seemingly unobtainable correlation of functionality, livability, adaptability and beauty. Hence, they seem to be expressing their apparent dilemma with plans for superblocks, isolated civic auditoriums, high-rise apartment buildings, expressway inter-changes and urban utopias—plans which in many ways deny the validity of the primary urban function and the basic reason for a city's existence. A city is

a creation of people for people. Restated, the primary urban mission is to provide facilities for the satisfaction of human wants and desires. A city, therefore, in terms of physical structure or any other criteria, is a subordinate concept, dependent on the needs of people for its existence. People are not dependent on cities to the extent many planners apparently believe. A city is people in action; more so than any other single thing the city mirrors the wishes and attitudes of its citizens.

The Planning Framework

Typically, our cities are unplanned. The physical form which exists is the product of socio-economic forces operating within the framework of the real estate market. For better or for worse, piecemeal expansion, occurring over decades, has been the logic of city growth. Admittedly, many of the by-products of this sporadic, unplanned expansion were and are highly undesirable. Sound realistic planning will require, therefore, the alteration and/or amelioration of these existing aspects of urban development. But far more important, in terms of long-run benefits, city planners must place primary emphasis on *preserving* the character, the uniqueness, the charm—in a word, the individuality of their city. The planner must know and understand his city; he must love his city for itself before he can approach the problem of rejuvenation and development in an intelligent and thoughtful manner.

The successful formulation and subsequent application of a master plan must occur within the ill-defined boundaries of an existing socio-economic and political framework. There are several axioms, or self-evident truths, which indicate the limits of this framework. Since the planner must hypothecate, formulate and operate his program within this imaginary arena, we will do well to examine several of these basic principles for they reflect the philosophy of prior city growth and must be used as guideposts for future urban expansion.

(a) *The Individuality of Cities.* The first principle has been stated: a city is for people. They have made the city what it is, for better or for worse. Its physical proportions, its economic and political activity, its

social composition were molded by people who sought to satisfy various desires through use of the city and its component parts. If prior growth has resulted in a seeming hodge-podge of land patterns and uses, it is not so primarily because previous generations ignored completely the concept of "highest and best socio-economic use." *Rather, this condition is due primarily to a lack of continuity in the utilization of land within and between succeeding generations of land users.* Intelligent planning requires, therefore, the preservation of as much of the individuality of the city as possible and the formulation of a plan which seeks to effectuate continuity in future land use. In other words, effective city planning must start with an investigation and understanding of the city as it exists.

(b) *The Market As the Primary Force.* Initially, city planners must predict what developments in land use would occur if the market were the primary determining force. Since the city exists primarily because of its ability to satisfy motivations or at least affords the opportunity for want-satisfaction, the primary determinants of physical form must be the preservation of a city's ability to perform this indispensable function. Contemplated changes, to be effected by the formulation and application of a master plan, must be based on a keen understanding of existing market forces. Then, and only then, can the planners provide for orderly future growth by deciding what aspects of predicted future growth are undesirable and altering, if possible, these particular patterns of growth.

(c) *The Area of Effective Control.* The planner must remember that the area over which he has effective control is very small when contrasted with the area over which he will have little or no control. Physically, the existing city structure, such as streets, buildings and vacant spaces, has developed over a relatively long period of time. Much of the space, particularly in the close-in commercial areas, has been committed to specific uses. Obviously, the planner's most effective area of control will include land as yet uncommitted to specific uses.

Socially, the planner must integrate his program into the existing and projected pattern of community social groups and their cultural characteristics. He must attempt

to change only those which are judged socially undesirable for any modification of the socio-economic forces operating within the institutional framework of the city and its real estate markets will be achieved only slowly and with great difficulty.

Politically, the planner attempting to institute and enforce a comprehensive plan will have to overcome the existing complexities of municipal administration which divide authority for many facets of the master plan among numerous agencies. We have, for example, health departments, sanitation departments, building inspection departments, police departments and fire departments (not to mention the duplication of many of these functions by county and city governments) all engaged in piecemeal supervision of one major area of city operation and development.

Ideally, these functions could be better performed by one central municipal agency. Perhaps we will come to this eventually. In the interim, however, the planner's burden will be compounded by the necessity for securing coordination among the various governmental bodies and their constituent agencies.

Finally, and perhaps the most important of all, the planner will have to overcome public apathy toward the concept of city planning. He must kindle public enthusiasm for urban rebirth by stressing the advantages of the program and the dire consequences of unabated slum growth and urban decay. Further, and of great practical importance, the support of business leaders and holders of municipal economic resources must be enlisted since urban rejuvenation will be a costly operation. Urban rejuvenation must be supported with citizen enthusiasm and dollars if such an immense undertaking is to ever become reality.¹

Planning Perspective

The many varied aspects of area planning are readily separable into two rather

¹ See Robert K. Brown, "The Role of Local Initiative in Urban Renewal," *Atlanta Economic Review*, Vol. IX, No. 1, pp. 3-8 for a discussion of the vital necessity of citizen participation in an urban renewal program.

obvious spheres of activity: those dealing with the physical aspects of urban development such as streets and buildings and those concerned with the more intangible sociological elements of the urban science such as people and cultures and motivations. Most planners agree readily on accepting their responsibility for the first grouping. Indeed, one major criticism of planning as a developing professional concept indites planners for their preoccupation with the physical aspects of urban development while paying too little heed to the necessity for introspection and assimilation of problems with the methodology of problem-solving.²

There is, however, some reluctance on the part of planners to accept responsibility for the sociological aspects of urban growth. Some lip service is paid to the necessity for coordination of urban physical and social aspects but acceptance of responsibility in this instance is assumed to be visible expression in proposed or operating programs. Thus far, evidences of this type are woefully lacking in area plans. Restated, the planner accepts willingly the burden of physical growth planning, for his concept of planning is based primarily on the implementation of society's desire for planned development which finds supreme expression in new physical things, the addition of which can be easily and readily measured, i.e., so many new buildings, x number of

stories high; x miles of new four or six-lane expressways, and so forth.

My intention is not to malign the physical evidences of growth insofar as their addition to the urban inventory is concerned. Obviously, they represent the most visible and hence believable aspect of "urban progress." But we must not let our preoccupation with the physical lure us into the belief that they are the most important aspects of the city form. The planner must pay due homage to the human element for the success of every facet of his plans depends on human motivation, acceptance and cooperation. He must, in other words, solve the apparent dilemma existing within his own profession, which has arisen as a result of striving for urban rejuvenation without adequate thought being given to the most important component of a city's development: its people.

Summary

Regardless of the sphere of influence in which the creative planner functions—whether it be that of creating new investment opportunities for capital expenditures, seeking to maximize city spending efficiency, increasing the functionality of city components, or a combination of these activities—his potential effectiveness will increase, *ceteris paribus*, as his philosophical inclinations tend to gravitate around the less tangible aspects of the developing city form. On the day of reckoning his success will be reflected in the competitive position of his city as it seeks residential, commercial and industrial citizens in the arena of city versus city, as viewed by potential land users.

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² For example, Kevin Lynch and Lloyd Rodwin, writing in the *Journal of the American Institute of Planners*, state: "Analysis of urban design is largely at the level of city parts, not of the whole. The prevailing views are static and fragmentary. . . . There are some reasons for this unsatisfactory situation. . . . The men in the field are far too preoccupied with practical problems to fashion new concepts." "A Theory of Urban Form," *Journal of the American Institute of Planners*, Vol. XXIV, No. 4, 1958, p. 201.

The Problem of Preserving Central Business District Values

VALUES in the central business districts of our cities are either being threatened by recent decentralization activities or have already declined. Lowering tax returns challenge the economic stability of our cities. Store and office vacancies in downtown buildings are increasing. What may be the ultimate consequences of continued decentralization no one knows. We can only speculate. The migration of population from near central locations to the peripheries of cities and beyond is viewed by many as "natural" and nothing over which to become unduly disturbed. Certainly, this migration is the greatest in the history of mankind and should not be taken lightly.

Investors in downtown property in numerous instances see the adverse effects of decentralization all too vividly. They are among those who have been forced to provide parking space for their tenants or for the latter's clientele as a way of meeting outlying competition. They have had to make improvements in the physical aspects of their buildings or lower their rents to discourage tenants from following the crowd. Or even worse, they have suffered daily monetary losses by virtue of their premises having been vacated by tenants in favor of peripheral locations.

If we examine valuations of downtown properties for taxation purposes, we find they have been reduced in a number of cities not only once but several times in the course of the past ten years. The curve of receipts has declined rapidly while that in new localities has gone up, even faster in some instances. Unfortunately, specific data for entire downtown areas are not readily available. Kalamazoo, Michigan frankly admits that in 1955 it "became vitally concerned" when it suffered a decrease of over \$1,000,000 in the reassessed valuation of the central business district. Retail sales also began to decline and "vacant stores and offices were becoming more familiar to the downtown scene." County auditors cite individual pieces of property, or as much as a city block, as having yielded less and less revenue while returns from most of the remainder of the business area have remained static. Public officials are not authorized to

reveal such detailed data for general publication.

While decentralization has been pointed up largely because of the impressive appearance of new concentrated shopping centers and vast new monotonous housing developments, other not insignificant phases of the movement, generally well known, have involved erection in outlying localities of medical office buildings, facilities for insurance companies, wholesale houses, research laboratories, and still other service institutions. Of course, an accompaniment of this migration has been small industries attracted perhaps in part by super industries which have located, in many instances, just beyond the political boundary of the central city.

Most of these business organizations have shifted because of better parking facilities or lower rentals and land values, sometimes better accessibility or, in the case of retail stores especially, proximity to the residents of new neighborhoods. Certain decorative features in peripheral localities such as artistically landscaped grounds are often possible features which make a special appeal to potential customers. In the new modern stores and office buildings greater floor area usually is available than in downtown buildings, generally without increased cost and with a smaller investment per unit. All of these factors, and particularly the one permitting the creation of a garden atmosphere on spacious grounds, are serving business whether industrial or retail, as powerful magnets which attract patrons and build good will. This latter situation is one which has moved downtown merchants to experiment with a relatively new idea for this country, the mall.

A mall as presently interpreted, involves the conversion of city streets, as many blocks as desired, into park and recreation areas for public relaxation and inspiration. These streets are thereby removed from use as avenues for vehicular transportation. In 1959 Kalamazoo converted two downtown blocks into a mall and so pleased were the people with the results that they extended the area in 1960 by another block. The mall "continues to be a tremendous success" is

the statement of one civic leader. In this instance, the action is part of the implementation of a suggested master plan. In the same year Toledo, Ohio converted four of its downtown blocks into a mall as an experiment. City authorities said that inasmuch as the downtown district includes only one percent of the city's area, but is the source of 17 percent of tax revenues, they want to preserve this asset. After repeating its experiment in 1960, the City Council voted to discontinue the mall declaring it unsuccessful.

A few years ago Fort Worth, Texas introduced what presumed to be a mall experiment but really did not produce a mall in the generally accepted sense. What they have called their "futura" runs for three days in October and consists of exhibits of products for sale, in a setting having a carnival atmosphere. The area involves some six downtown city blocks. Whether this program is to become an annual feature is still to be determined.

Knoxville, Tennessee has razed its old market house and will replace it in 1961 with what the city designates as a mall. Other nearby buildings will be torn down or rehabilitated with the idea of tying in with the mall or becoming a part of it. Not far away a "Promenade" which might be described as a small downtown shopping center was dedicated in 1960 and reported by the *Knoxville News-Sentinel* as one of several "projects aimed at revitalizing downtown."¹

The results of these experiments and those in other cities are not yet wholly clear and probably will not be for several years. In the first place, the malls are usually located on streets dominated by chain stores and a miscellany of small independent shops, with occasionally a large department store. Interviews with individual merchants and inquiries made among organizations reveal differences of opinion as well as different experiences concerning mall virtues. Some persons are quite enthusiastic but acknowledge they do not as yet know whether their current increase in business has resulted from a public which

has been momentarily curious or whether their interest will continue to bring them back to the mall as permanent customers. Some merchants are opposed to the mall because street parking in close proximity to their stores has been removed. A few dealers not located on malls report a slight business increase while others note a decline. The president of Downtown Toledo Associates is quoted as saying that "the malls had an adverse effect upon business."²

As might well have been expected, new problems have arisen as old ones appeared headed for solution. Access to buildings by the fire department in a few instances has been impaired. Loading and unloading activities have been hampered. Traffic which had previously used the streets now vacated has had to seek other routes, tending in some instances to congest tributary arteries. To compensate for the loss of parking spaces new areas have had to be provided and these are located at varying distances from the mall. Assuming the mall has proven successful in attracting customers, continuation of this upsurge demands a greater number of parking spaces than were previously available. Where to get them is not always easily answered. In Kalamazoo a few antiquated buildings have been torn down or are in the process of being eliminated to make room for parking lots. Such lots are either metered, with a low level scale of prices, or ramp garages are in the process of being erected. Some merchants offer free parking with specified minimum purchases.

Parking in its various aspects is still critical where malls have been introduced. Parking spaces must be located in close proximity to the objectives of the people, and rentals must be quite low, if not free. Where lots or garages are already operating under private ownership it is dangerous for the local government to compete by offering low charge facilities. Such action contains political dynamite. Some city administrations have built parking garages but charges are much the same as those made by private operators. Naturally, the point at issue is whether or not private rights shall

¹ *The Knoxville News-Sentinel*, "Promenade Open," March 2, 1960, p. 29.

² *The Columbus Dispatch*, "Toledo Mall Plan Is Called A Failure," November 18, 1960.

supersede benefits to the public as a whole. This is particularly significant where failure to take bold action means disadvantages for all. If a city were to venture into low-cost parking which could threaten the existence of private services, then the latter might well be compensated out of public funds against loss. Such behavior might be mistakenly dubbed socialistic when it would really be only economic and social.

Where is the space for parking lots or garages in the downtown district? Rare is the city that has no outmoded structures, as well as unsightly ones, which either yield no returns or possibly only limited returns from the occupants of the main floor. These buildings should be torn down. Not only could the newly available land be used for parking, for a parking garage or for a park (that is, an *off-street* mall area) but any of these new uses would enhance the appearance of the immediate locality. If the new space be large enough it might serve a combination of purposes. The end result would be not only the disappearance of an eyesore but an increase in value of both the rehabilitated property as well as adjacent properties.

What is meant by low-cost parking? This question must be answered in the light of free parking in outlying neighborhoods. Logically, no low cost parking is quite as low cost as that which is free. But where charges are as low for example, as in Ashland, Ohio, where the city has established self-supported metered lots in the downtown area, at five cents per hour and less, the potential parker is not frightened off. But all parking need not be as low in cost. Investigation has revealed that most of those persons who go downtown to transact business of whatever nature and who might be classified as of the shopper type, in contrast with those who are employed in the district, visit downtown only once or twice a month. They seem to be willing to pay more than five cents an hour. A large department store in Columbus, Ohio erected a garage within a half block of its establishment and charged fifteen cents per hour. Its customers and the general public took to this facility so enthusiastically that the company erected two more garages and now a fourth one is under construction. The store views this investment to have been

one of the best it has ever made. More than likely, any charge higher than fifteen cents would deter many persons from patronizing such garages and hence from transacting any business downtown if it were at all possible for them to satisfy their needs in outlying localities. Persons in the higher-income brackets usually are not deterred by higher charges but their numbers are too few to generate the bulk of the necessary downtown business.

Although the mall seems not to be *the* solution to reviving downtown business, it does point up certain public reactions which might be capitalized in other ways. Inasmuch as the underlying appeal of the mall lies in its satisfying the aesthetic sense of the individual, some improvement in the physical setting of the business district seems in order. Planners have noted that most persons are reluctant to walk more than 800 to 1200 feet from their parked cars to the place where they have business to transact. One explanation of this reluctance is found in the drabness of the locality. Spruce up the streets and the public may respond with greater enthusiasm. In London, England famous Regent Street, a part of which is curved, is flanked by architecturally beautiful buildings. As the shopper walks along the street his interest is held by an ever changing attractive landscape. His curiosity is also aroused for, since he can see only a part of the avenue at any given time, he is caused to wonder what is just around the bend and is thereby encouraged to continue walking and to forget the element of distance.

Cities cannot easily change their streets from straight to curved. But they can dress up their buildings. They can use window flower boxes effectively. They can either paint or reconstruct building fronts in part or whole in a manner to introduce color as has been achieved in Cleveland, Chicago, Columbus, and elsewhere. Trees and flowers, where sidewalks are wide enough, can be set up in large containers as has been done along Euclid Avenue in downtown Cleveland, Ohio and in downtown areas of a few other centers. Artistic decorations may be installed at building entrances, undertaken by banks, public utilities, hotels, and other service structures. A classical case of an increase in property values through an im-

provement in building appearance is on record in Chicago. Some years ago new plans called for widening Michigan Boulevard at its northern end, requiring the cutting back of buildings and erecting new fronts. Property owners objected. State enabling legislation gave the city power to overrule the opposition. The street was widened, new fronts, many of them colorful and all of them unusual, were built. Property values have been reported as having increased sixteen-fold. No further dissents were registered. The aesthetic can also prove to be "practical." In Sao Paulo, Brazil, South America's principal industrial city, an amazing number of tall, highly modernistic buildings has been erected and many more are under way. Most of them are effectively decorated and, in spite of a certain amount of crowding, grass plots often with trees and shrubs are squeezed in between the buildings and the sidewalks. Mosaic designs in a few instances ornament parts of the lower facades.

As previously noted, serious objection to most of the current malls lies in the removal of a street or portion thereof from use as a medium of circulation. Streets are intended as avenues for communication and when closed usually hamper circulation. In some instances malls have increased congestion along tributary streets and this in turn has called for a reorientation of traffic, even at a considerable distance from the downtown district, and not always advantageously. It would seem that unless a street is obsolete it should be preserved for its original purpose. Malls which do not obstruct traffic flow, as one finds frequently in many foreign cities or occasionally in the older sections of some early American cities as for example New Orleans, Louisiana, and Charleston, West Virginia, are well worthwhile.

Unfortunately, inadequate scientific investigations have been made to bring to light just what has underlain recent changes in public behavior with respect to the central business district and what may be done to counteract the public's adverse attitude. Most persons would say off-hand the new situation is due merely to the advent of outlying shopping centers and traffic congestion. For investors to accept such conclusions without substantial studies is

much too hazardous. The problem is complex. It calls for a consideration not only of public reactions to new physical urban patterns, but of changes in attitudes of the public itself, of increased transportation costs, new social philosophies, and the role of opportunists who have capitalized upon the decentralization movement as a means to monetary gains.

In this discussion of decentralization, as a problem for investors in downtown properties, more questions have been raised than answered. This, of course, follows from the fact that decentralization, although not new, has recently occurred at a highly accelerated pace. More time and more searching systematic inquiries into the dynamics of the current kaleidoscopic action are essential for the determination of appropriate ways and means to stabilize and to develop further, sound values in central business districts. Ultimately, all patterns of the past may have to be discarded and new concepts launched relative to the physical setting in which a city's economic life may best be advanced.

One such "bold idea" has been offered in London, Ontario, where a "gray belt" is developing in the downtown area. A proposal has been made to restore buildings erected about a century ago and to convert the locality into a "Williamsburg" exhibit. Theoretically, thousands of tourists would be intrigued and of course property values increased. There are those who smile at the idea but perhaps it has merit.

In considering a readjustment of the service aspect of the central business district those responsible should never lose sight of the relation of a city to the larger region of which it is a part, that area which is often referred to as the hinterland. The automobile, airplane, and even the declining railroad facilitate the movement of peoples in and out of our cities more effectively than ever. Apparently, persons from the hinterland still find greater convenience in carrying on business, especially if it is multiple in nature, in the heart of a city than in scattered peripheral neighborhoods. So it is that in a few cities, New York City, for example, seemingly strange things are happening. While department stores join the trek to the suburb by building or leasing branch stores the downtown

area enjoys one of the greatest building booms in its history. The new structures, to be sure, are largely office buildings with a few street-level stores. Nevertheless, they serve the public although a considerable part of that public is from outside the city.

The element of accessibility—that is, the ease with which one can get to or from a place—is of prime importance both from without and within a city. Most specialists in the subject are agreed that downtown areas have become progressively less accessible as population has increased, city areas have expanded and the number of automobiles has multiplied. Expressways and street widening have not afforded the relief sought to ease traffic flow. A school of thought, convinced that these efforts are not the solution because there is neither space enough nor money enough to provide the number of necessary networks has turned to mass transportation as a way out. To this end some cities have undertaken to revive local railroad services through partial subsidies. Philadelphia and Boston have entered into such arrangements. Cleveland, Ohio has built a rapid transit line and Toronto, Canada a subway. Of course, New York City has long relied upon its subway to do the job. In nearly every instance returns have been beneficial but inadequate because of the limited areas served.

In an item concerning the space factor a writer makes significant comparisons among the passenger-carrying capacities of several different media. He points out that the most modern freeways can carry per hour, per lane, by private automobile 2500 persons, by bus 5000 and by rapid transit railway 40,000. He says "This means it would require no less than twelve highway lanes to replace a single railway track."³ These figures point up the virtual impossibility of providing satisfactory accessibility to downtown districts by private automobiles. And certainly the necessary parking facilities to accommodate all of the vehicles would not be economically feasible.

There seems to be general agreement that the privately-owned car combined with more paved roads will not save the central business district. Many families requiring transportation do not own cars. In families that do have a single car some members must still depend on public transportation. In those regions where winters are severe and there is occasional snow or ice accumulations even the lone car can not be used and resort to public transportation is necessary, a form of transport not always geared to take care effectively of such emergencies. These circumstances again turn public attention, temporarily at least, to the potentials of mass transportation facilities.

Effective mass transportation, in the light of current urban population distribution patterns is difficult to achieve, if achievable at all. The density of population in outlying residential areas is too low to make possible the operation of bus lines or other forms of transport at moderate fares without incurring a deficit. In consequence there are those who advise that public ownership of transportation lines be substituted for private, on the theory that the local government can compensate for deficits merely by increasing taxation. If it were possible to convert single residence areas into high-rise apartment districts so as to increase the population density, public transportation lines might fare very well.

One investigator suggests: "When the day comes that the time spent commuting cancels out the value of making the trip, then the spread of suburbia will stop and a return to vertical city living will be necessary to the growing hordes of humanity."⁴ This man may be right. Consistent with this philosophy is the thought that urban renewal activities in the vicinity of the central business district might check decentralization and actually reverse the flow of population, once again providing the downtown merchants with a substantial market. It has been said that history repeats itself and hence the return to the early relationship just cited is quite within rea-

³ Robert B. Shaw, "How Breakdown In Transportation Is Creating Vast Economic Problems," *The Magazine of Wall Street*, June 20, 1959, p. 418.

⁴ Edward Higbee, *The Squeeze-Cities Without Space* (New York, New York: William Morrow & Company, 1960), p. 114.

son. If, however, a repetition means retrogression, repetition is not likely to occur. This then leaves the interrelation of the heart of the city and population distribution in a physical sense a matter of considerable uncertainty.

It is hard to believe that the population of any city would wilfully abandon the downtown area even though it has unwittingly done so upon a limited scale. If all of the central district were ignored, a substitute would have to be found. Virtually every suburban locality, it would seem, would have to establish a complete central business district for itself. This would not be practicable nor economically satisfactory. In fact, if attempted it would merely reproduce the problems of the mother city. Abandonment of downtown with its investments and enormous amount of working capital, while seemingly inconceivable, dare not be shrugged off, for experience in such matters is still limited.

A possible factor in slowing down decentralization could come about through the appreciation of outlying land values to levels which would make building sites no longer economically attractive. Rentals might rise also to discouraging heights. These occurrences combined with an improvement in the accessibility of the urban core might offset the recent advantages of outlying properties and restore the heart of the city to its former vigor. Those residents seeking utopia in peripheral areas should note that, if land values in the central business district decline thereby reducing tax returns, the deficiency would have to be countered by higher taxes on residential properties. This alternative if made clear to the public could slow down continued areal expansion.

In view of the fact that the horizontal spread of cities does not occur uniformly, but in a kind of hop, skip and jump manner, many "holes," that is unoccupied areas, have appeared. Facilities such as water and sewer lines and communication facilities must cross these holes and be paid for. This means increased taxes. A reversed population movement which would fill these holes could either stop a rise in taxes or even reduce taxes. Occupance of the holes would consolidate the population and

could help to give greater economic support to the central business district.

The more or less concentric form of cities has been looked upon in this country for so many decades, and abroad for centuries, as a normal pattern, that few persons have been disturbed by the thought that a radical modification could come about. Downtown districts have acquired such great momentum that reference to the possibility of their decline has, until recently, been looked upon as ridiculous by almost everyone. In fact, in the face of what is happening there remain all too many who are not concerned. No longer is the possibility of reduction in momentum mere theory.

POPULATION CHANGE, 1950 TO 1960, IN SELECTED STANDARD METROPOLITAN STATISTICAL AREAS

	Central City		Outside Central City	
	Population		Population	
	Change %		Change %	
Atlanta	154,111	46.5	133,249	33.7
Boston	-123,818	-15.4	274,696	17.1
Chicago	-128,017	-3.5	1,100,681	70.7
Columbus, Ohio	89,250	23.7	83,982	65.9
Denver	73,431	17.7	237,602	121.0
Houston	336,517	56.4	91,650	43.5
Philadelphia ..	-111,569	-5.4	729,715	45.6
Seattle	82,934	17.7	169,272	44.9
St. Louis	-116,372	-13.6	437,272	50.7
Washington, D. C.	-55,220	-6.9	559,693	84.6

The above selections give emphasis to the tremendous increase in population in peripheral areas of metropolitan cities. Although some of the increase in settlement has come about through immigration from other centers most of the population has come from the central city.

The momenta of cities need to be analyzed for the nature of their structures, for the relative stability of their respective parts, and for the changes which have occurred. Although cities are thought of as much alike in principle the fact remains they have much individuality. For this reason an analysis may not be expected to provide an over-all generalization. On the other hand it is conceivable that some generalizations may be arrived at along with those findings which are peculiar to each city. For example, St. Louis and Chicago, both inland cities in a sense, and both located on water bodies albeit of different types, have central business districts which in common possess department stores, hotels, office buildings, banks and many other functional institutions. But the patterns

of the two cities differ, the characteristics of their populations are unlike in some respects, the historical backgrounds of the two centers are unlike and, accompanying the differences in functions performed in terms of the commodities handled, the goals of the businessmen in the two centers take on a different order. These differences must be reckoned with in any appraisal of the potentials of their respective central business districts. Perhaps only the new miracle computers can derive reliable forecasts from the very complex data involved.

In a statistical analysis by C. T. Jonassen, significant findings were made contradicting some of the popular beliefs with respect to the inlying and outlying services.⁵ The studies covered Columbus, Ohio, Houston, Texas and Seattle, Washington. A few of the conclusions are well worth noting. "Examination of the spatial pattern of shopping reveals that food, doctor's care, and movies are sought nearer home, and that buying of clothing, shoes, and house furnishings is done predominantly downtown." "The most important disadvantage of the central business district was difficult parking; next in importance was 'too crowded;' and third, traffic congestion." In contrast, "the advantages" were: first, large selection of goods; second, 'can do several errands at one time;' and third, 'cheaper prices.'" The chief attraction of suburban shopping was "closeness to home."

Apparently, "higher socio-economic groups living at the periphery of a city, patronize downtown more, and evidence more favorable attitudes toward it than do lower economic groups." Persons with an income of \$8000 or over were less concerned about parking and traffic congestion than those in the bracket, \$4000-\$5900. In certain age groups, "the 50-64 year category is more strongly oriented toward downtown than is the 18-34 or the 35-39 year group."

Dr. Jonassen is of the opinion that "the changes taking place seem to involve a general redistribution of functions." He concludes, the suburban shopping center in

the cities studied has "as yet not developed to a degree which seriously endangers the integrity of the downtown area." Some businessmen are of the same opinion. "Downtown facilities may increasingly serve specialized needs." The latter type of adjustment may be in progress. Many leaders agree that new adjustments must be made. If downtown districts are in a stage of functional readjustment, then all property owners should become fully aware of this situation and make their plans accordingly.

In summary of what needs to be done to bring about the preservation of property values and, in turn, vast investment in the central business district, certain things seem clear. Every community should be examined for the following aspects in addition to those characteristics which are peculiar to each one:

- (1) Is there sufficient low-cost and free parking?
- (2) Should the district be converted to stimulate outlying areas in terms of landscaped grounds and open spaces? If so, can this be done at a reasonable cost?
- (3) Can parking spaces be created without withdrawing portions of streets from use as vehicular arteries?
- (4) Would one or more malls be desirable and if so what should be the pattern of distribution?
- (5) Would dressing up of buildings, now drab, be practicable and if so would this action add to the attractiveness of the district? Should such dignified decorations be restricted to retail stores or include certain other buildings such as office structures, and others. If this action be deemed appropriate, should it be put into work as each property owner sees fit or according to an overall plan?
- (6) To what extent should obsolete buildings be removed entirely, partially, or remodeled?
- (7) Would mass transportation or other modification of the transportation system, come to the "rescue" of the central business district? What is the relation of the cost of such transportation and its accessibility to homes,

⁵C. T. Jonassen, *The Shopping Center Versus Downtown* (Columbus, Ohio: Bureau of Business Research, The Ohio State University, 1955).

to the likelihood of reviving the business district?

- (8) In the light of the factor of centrality which heretofore has given value to the downtown area, how much of that characteristic has now been subtracted? Is centrality still essential for certain functions and not for others? Can centrality be restored where it has disappeared?
- (9) What are the limits to which current decentralization can go without lowering downtown property values to a level at which drastic action must be taken?
- (10) Is there a level to which land values in outlying areas may rise which in turn will discourage further decentralization?
- (11) How much remains of the momentum

acquired by the downtown district through many decades of service to the whole community? If some of the momentum has been lost, of what did it consist and would it be desirable to try to restore it or, preferably, to make a new adjustment?

Of one thing we may be certain. Central business districts which developed because of the advantage of centrality still retain the latter virtue. Some of it, however, has been lost to certain types of businesses or is in the process of being lost. What remains, it seems, offers great potentials for those cities that possess unafraid leaders alert to their opportunity to achieve successful ends in new ways.

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A Review of Landtype Classification and Mapping†

LAND in its physical aspects may be subdivided into several principal components, the most common being: soil, climate, topography and relief, vegetation, and geographic location. Physical land classifications, which have been developed to provide sound frameworks within which land use problems can be approached systematically, have taken and can take many forms, with purpose and geographic location of the study area being major determinants of the kinds of subdivisions or "land" units that are identified and delineated.

Land, the complex of many interrelated and integrated parts, performs as a combined entity not separately as soil, topography, climate or vegetation. Through the principles of classification, however, land variability can be expressed in terms of those combinations of features that may be judged significant and/or of practical use

to meet a specific purpose or set of circumstances. Various characteristics of the major land components can be selected for use as classification criteria on the basis of their effectiveness for indicating performance capabilities of land in a variety of kinds and intensities of use.

This article will review several land classification systems that have been developed and used in recent years. Within each of these a type-of-land or land type unit, depicting patterns of land defined in terms of what appear to be significant features of the various components of land, has been recognized as being especially useful as a basis for subsequent interpretations and assessment of productivity, land use and suitability for various intensities of use.

The objective of the writer is to present (1) the suggestion that there is a need for greater emphasis on the development and application of land classification concepts that identify patterns of characteristics meaningful to the systematic analysis of land for agriculture, forestry, recreation, watershed and wildlife uses, and (2) a review of concepts that have been developed

† This article was completed by the author under the direction of Professor H. E. Conklin, Department of Agricultural Economics, New York State College of Agriculture, Cornell University.

by various individuals whose primary concern is that of providing multiple feature descriptions and maps of land resources for use in regional planning and assessment. These summaries are presented to serve as illustrations of some of the techniques and theoretical means that are available for use by those concerned with multiple-use planning of land resources.

Multiple-feature landtype classifications and maps can serve to fill the gap between the highly generalized concept of geographic regions and the detailed array of classes presented by such units of classification as soil series or site types. They should prove to be most useful to persons interested in obtaining a general but complete picture of large areas of the land surface.

One of the earliest discussions on the problems of locality assessment with respect to forestry and agricultural resources was presented by Bourne.¹ This writer stated that "local conditions are influenced by geographical position, by climate, by topography, by geology, by soil, by vegetation, by animals, and last but not least, by man. These factors directly, or indirectly through their effect on one another, determine the environment in which a crop has to grow and the conditions under which it has to be harvested." In his investigations he noted that one fact stood out quite clearly—the frequent possibility of recognizing sites. Bourne defined a site as "an area which appears, for all practical purposes, to provide throughout its extent similar local conditions as to climate, physiography, geology, soil and edaphic factors in general. While a site may be unique, more often the same type of site is to be met with again and again within some identifiable area."

In all the areas he sampled, Bourne observed that points were frequently reached in sample strips beyond which the further occurrence of recognized sites ceased, i.e., a different type of country had been entered. "Viewed in perspective it became immediately clear that a regional boundary had

been crossed, and that an association of sites really constitutes a distinct region." This latter unit recognized by Bourne is very similar to the landtype and land system units of classification used in investigations that are summarized further on in this report.

The regions which Bourne delineated were "essentially natural units of country. But the nature of the sites of which a region is composed and the relative distribution of those sites dictate the technical treatment of the region as a whole. They do not, however, take into account questions of accessibility and general economic considerations," which, according to Bourne, were irrelevant to a scientific classification of regions. Land assessment, in terms of suitability for specific uses and intensities of uses, was described throughout the examples of experimental regional surveys included in Bourne's report.

J. O. Veatch², whose investigations were centered in Michigan, described and recognized classification units termed landtypes. In his papers he outlined a kind of natural division of land surface, combining features of topography and soil into units to which economic studies pertaining to the use of the land could be related. He stated that the ideal natural geographic division would combine natural groupings of climate, physiography, topography, vegetation, animal life and soil. He, however, restricted the coverage of the land characteristics in his classification to features of micro- and macro-topography and the soil.

Veatch recognized that for many economic studies and similar undertakings, the soil type units classified in his time were too detailed and awkward. He suggested that geographically related types could be combined into larger landtype units. The landtypes would be especially useful where the objectives of a study were concerned with land classification and land planning in their broader phases.

¹ Ray Bourne, *Regional Survey and its Relation to Stocktaking of the Agricultural and Forest Resources of the British Empire*. Oxford Forestry Memoir No. 13 (Oxford, England: Clarendon Press, 1931).

² J. O. Veatch, *Agricultural Land Classification and Land Types in Michigan*, Agricultural Experiment Station Special Bulletin No. 231, Michigan State College, East Lansing, Michigan, 1933; and "The Idea of Natural Land Type," *Proceedings Soil Science Society of America*, Vol. 2, 1937.

In his report on the soils and land of Michigan³ Veatch concluded that the soil survey maps constituted the best single basis and source of facts for a division of the state into natural landtypes. "This is true," he stated, "because the so-called soil types on the maps are not ultimate pedologic units, but are in reality soil associations that imply geomorphic and vegetational distinctions along with the pedologic ones." The landtypes in his 1953 report were described in terms of criteria selected from soil, physiography, topography, and to a limited extent, vegetation. Generalized performance characteristics were outlined for each major landtype in terms of suitability for specific land uses, relative productivity, and adaptability in various intensities of use.

Landtype classifications similar to the one developed in Michigan have been applied elsewhere in the United States. In California, for example, Weeks *et al*⁴ used a land classification procedure that consisted of ascertaining the physical characteristics of the land and of distinguishing between areas possessing distinctive patterns of characteristics. In order to observe associations between physical characteristics of land and the utilization complex, the study area was classified into a number of land-character types. In outlining these land-character types, data on climate, soils, topography, natural vegetation and timber-site quality were recorded on a series of maps. These maps were then superimposed one upon another and land-character types were delineated, each described in terms of a certain pattern of physical features and characterized on the map by classes of vegetative cover and composite classes of topography and soils.

Although this approach to land classification was based upon purely physical criteria, these land-character types had

special economic significance with respect to land use determination. It was pointed out that "by delineating such combinations of physical factors, a basis is provided for the determination of the economic contributions of the different areas and reasons for the existence of major use patterns, for land classifications, and for local planning of land utilization. . . . Cropland, for example, though physically adapted to orchard crops, if surrounded by land suitable only for permanent pasture, may be used more economically in a given farm program for producing livestock feed than for orchard. Similarly, small areas of land physically adapted to farm-crop production may not economically be adapted to farming if they occur in small isolated areas among extensive areas of land having very rough topography." The economic significance of some of the major differences in land character are discussed throughout this report as the various phases of land utilization are outlined.

The land classification used by the California investigators is primarily a factorial approach in which each major component of the land is examined and classified separately, and later combined by using systems of overlays to arrive at the final land-character types.

On the other hand, the classification system developed in Australia used a method whereby the mass of detail over large areas was mapped as complexes of country, the detail being indicated but not necessarily mapped as such. The objectives of these surveys, according to Christian,⁵ "were to describe, classify and map, and assess the land use, developmental possibilities and technical problems of large areas of country about which there was relatively little recorded scientific information and in which there was not any long term traditional form of land use." This extensive program of regional survey and potentiality assessment was begun in Australia in 1946 by the Commonwealth Scientific and

³ J. O. Veatch, *Soils and Land of Michigan* (East Lansing, Michigan: Michigan State College Press, 1953).

⁴ David Weeks, A. E. Wieslander, H. R. Josephson and C. L. Hill, *Land Utilization in the Northern Sierra Nevada*, Special Publication of the Giannini Foundation of Agricultural Economics, University of California, College of Agriculture, Agricultural Experiment Station, Berkeley, California, 1943.

⁵ C. S. Christian, "The Eco-Complex and its Importance for Agricultural Assessment," *Biogeography and Ecology in Australia* (Uitgeverij, Netherlands: W. Junk, Den Haag, 1959); and "The Concept of Land Units and Land Systems," *Proceedings of the Ninth Pacific Science Congress*, Vol. 20, 1958.

Industrial Research Organization, Division of Land Research and Regional Survey.

Since many of the areas that were studied were very large, considerable emphasis was placed on the use of aerial photography and an adequate ground sampling method, correlating air photo and ground characteristics. Detailed mapping of individual characteristics was not feasible and this led to the mapping of complexes of terrain rather than the separate mapping of individual characteristics. From this arose the concept of land, land units and land systems which formed the basis on which the present survey methods have largely been built. This concept served to identify environments rather than single features and so aided in the analysis of landscape into like and unlike environments.

The following definitions of terms used in the survey are taken from Christian's papers. The term *land* refers to all those physical and biological characteristics of the land surface which affect the possibility of land use and which are of importance to man's existence and success. In practice it refers to the more obvious features of land, namely to topography, soils, vegetation and climate. A *land form* is regarded as the product of particular geomorphological processes acting on particular geological material for a particular period of time. With such a physical evolution there will also have been an accompanying and interacting biological development leading up to the present biological characteristics. The combination of the physical characteristics of the land form and its biological characteristics constitute the *land unit*. The *land system* is a naturally occurring pattern of land units, geomorphologically associated and morphogenetically related. The boundaries of a land system coincide with the limits of major geological, geomorphological, climatological or biological features.

The description and classification of the land system of a region constituted the first stage of the program. This information presented a framework into which more detailed information could later be fitted.

The assessment of land use potentialities represented a second stage of the investi-

gation. This phase of the work was regarded as a continuing process and, as new knowledge became available, always subject to revision. "In the initial assessment the significance of observable characteristics of the environment is interpreted as well as possible by deduction or by comparison with known responses in other localities."

There are, of course, some limitations to what can be gained from some of these applications. Christian points out that the best that can be expected from the initial assessment in new areas is a broad statement on the likely scope for land use and its most obvious problems which can then be tested by experiment. It will serve to separate those areas worthy of more immediate and intensive study from those which could well be disregarded for the time being.

In the foregoing surveys, as in most studies of the physical characteristics of land, the landtypes or patterns of land recognized are not intended to provide the final answers to regional potentialities but rather to provide a scientific framework within which subsequent investigations and experiments can be planned or carried out. It is through experimentation or observation of land in use within this framework of morphologically defined classes of land that the economics of land differences can be studied and assessed. Results of these studies can then be applied to similarly designated types of land, with or without modifications, depending on the effects of geographic location, distribution among other types of land, various institutional factors, and so on.

In North America, landtype maps and classification units have not been applied extensively to the assessment of land for agriculture, or for forestry for that matter. The concept of soil associations, however, has developed in recent years and these units of higher cartographic and categorical generalization allow for the identification of patterns of land that are meaningful to farming. An excellent example of this approach to agricultural land classification is presented by Cline⁶ in his *Soils and Soil Associations of New York*. Soil associations as defined by Cline are "areas within which you will find two or more different

soils that characteristically are side by side within a single field or farm." Most of the soil associations are dominated by soils of one catena. A few have nearly equal proportions of two catenas. The soil association unit as used and defined by Cline is similar to the landtype unit recognized by many of the foregoing writers.

Earlier investigations using the soil association concept have been described by Ellis.⁷ Ellis' "association" was based on geologic parent material and included the genetic soil types or "associates" found in association on a given parent material.

Hills⁸ prepared a preliminary classification of Northern Ontario lands according to their potential for agricultural production. To evaluate land by examining the soil profile alone was regarded as being so highly technical by Hills that he proposed his method of classification as a possible alternative. This scheme involved: "(1) Establishment of climatic regions having similar local climatic conditions on similar land forms. [These regions were defined largely on the basis of temperature efficiency values calculated by the Thornthwaite formula.] (2) Determination of the variations in the topography, the physical constitution and the chemical nature of the geologic materials that affect land use within each climatic region."

In practice, each climatic region was subdivided into groups of geologic materials (parent materials of soil) according to the qualities which made them suitable for farming, irrespective of climatic and soil profile, that is, according to their arability. The qualities considered were soil texture, drainage, permeability, infertility, stoniness, shallowness over bedrock, erosion and

slope. These qualities were then examined to determine the expenditures in time, labour, and money necessary to bring the land into satisfactory agricultural production, and an agricultural use capability rating was established for comparisons of the agricultural potential of different kinds of lands within regions.

This scheme differed from the agriculture use-capability classes of the United States Soil Conservation Survey in that it was dependent upon costs of development (clearing, drainage, improvement of tilth and fertility) as well as upon control of erosion and maintenance of soil productivity.

In this classification the ratings of productivity were comparative; that is, they "reflected the ratio of output over input based upon the common crops grown in the region and the most suitable known methods." The lands within each climatic region were rated from Class A (the best) to Class H (the poorest).

Up to this point the investigations that have been reviewed have been concerned primarily with the identification and mapping of land patterns meaningful to agriculture. There are, however, no reasons why landtype mapping and classification concepts cannot be successfully applied to the assessment of forest land resources; in fact, in classifying forest areas an investigator's task would probably be simplified since he would be able, in many instances, to observe and classify vegetation-terrain patterns that have not been extensively modified by man's activities. Although a program of physical forest land classification has not been completed for any large area of land, several excellent demonstration studies have been carried out to illustrate fundamental approaches to the problem.

In 1950 and 1952 Hills⁹ wrote papers in which he criticized existing methods of site and land classification as applied to forested areas, and in which he stated his philosophy

⁷ Marlin G. Cline, *Soils and Soil Associations of New York*, Cornell Extension Bulletin No. 930, New York State College of Agriculture, Cornell University, Ithaca, New York, 1957.

⁸ J. H. Ellis, "A Field Classification of Soils for Use in the Soil Survey," *Scientific Agriculture*, February 1932; and J. H. Ellis and W. H. Shafer, *Report of Reconnaissance Soil Survey of South Central Manitoba*, Manitoba Soil Survey Report No. 4, Manitoba Department of Agriculture, 1943.

⁹ G. A. Hills, *The Classification of Northern Ontario Lands According to Their Potential for Agricultural Production*, Soil Report No. 1 (mimeographed), Research Division, Ontario Department of Lands and Forests, Toronto, Canada, 1949.

⁹ G. A. Hills, "The Use of Aerial Photography in Mapping Soil Sites," *Forestry Chronicle*, March 1950; and *The Classification and Evaluation of Site for Forestry*, Research Report No. 24, Research Division, Ontario Department of Lands and Forests, Toronto, Canada, 1952.

on the subject of forest site evaluation. "A forest site must be conceived as a complex system in which forests become established, grow and disappear. Site is the integrated environmental complex of all the features of a prescribed area, and as such, is a specific unit."

Physiographic features were chosen by Hills to constitute the logical frame of reference for his approach to "total site" because these were the features which were most easily recognizable and which resisted loss of identity to the greatest degree. He did not suggest that these features were to be considered the most important at all time or in all circumstances.

The primary site units recognized and defined by Hills seldom followed a natural distribution in nature in broad uniform areas and hence it became necessary to map patterns rather than single types. Landtypes were established as units of convenience designed to map and describe site patterns over relatively large areas. Although landform provided the most convenient basis for landtyping it was stressed that geological maps did not meet the requirements of a landtype map. "To transform a landform map into a landtype map the emphasis must be changed from the demonstration of some geologic principle or theory to the interpretation of potentials for plant growth. A landtype map must carry a shorthand description of the physiographic environment as a basis for crop production. Accompanied by maps and descriptions of the forest cover and other biological features, a landtype map presents an inventory of the area for growing forest crops, whether these are present on the area or not." Landtypes, as used by Hills, were ecological units combining factors of the environment into patterns which were of significance in the production of forest or agricultural crops.

Hills and Portelance,¹⁰ in a recent report on multiple land-use planning for the Glackmeyer area in Ontario, have presented an excellent illustration of a fundamental

approach to land-use planning which has a broad application. The primary objective of the investigations carried out was to obtain data which would illustrate the problems and principles involved in planning land use in the farm-forestry area of the Cochrane Clay Belt in northern Ontario. In classifying land in this area landtypes were established to serve as a basis for the derivation of units of differing potentials for land use planning. Landtype units of the area were defined in terms of the pattern of physiographic sites developed on a given landform as a result of the interactions of regional climate and vegetation with relief and soil materials. The distinctive patterns of physiographic sites, of biotic types and of soil types were described within each landtype. Land-use capability patterns were then established for these units.

Within this physical land framework the investigators outlined a Multiple Land Use Plan for the Glackmeyer area. This plan was a complex of several interlocking land-use plans proposed for agriculture, forestry, wildlife and recreation.

The combination of factors that were deemed important in the consideration of the magnitude and order of agricultural development were: "(1) The distribution pattern of lands of high potential. (2) The distribution pattern of established farm units. (3) The distribution pattern of farm land which has been improved but of insufficient acreage to constitute an established farm unit. (4) The distribution pattern of land cleared but not improved. (5) The location in regard to main highways and markets. (6) The extent of present rural services." Following the designation of the limits of expansion of the agricultural community a Forest Land Use Plan was drawn up to provide a framework for the forest management of the remaining lands of the Glackmeyer area. Forest use capability ratings, defined in terms of potential yield-quality production classes, were established to allow comparisons of the potential productive capacity of the land units. The actual productivity of the forest types which might be established on a given area might, however, be appreciably less than the potential productivity because of variations in past disturbances and cropping practices. The potential productivity ratings

¹⁰ G. A. Hills and R. Portelance, *The Glackmeyer Report of Multiple Land-Use Planning*, with Research Supplement by G. A. Hills and A. N. Boissoneau, Ontario Department of Lands and Forests, 1960.

were therefore modified by setting up proportionate production classes for each given combination of forest use capability class, site condition class, and forest cover type. Finally, for each unit, degree-of-effort classes (defined in terms of per acre costs of establishing and maintaining forest types of a high proportion production) were established, based on estimates of brush competition potential, density of stocking and species composition of the present cover. The final forest use plan gave a picture of the forest land resources of the Glackmeyer area grouped on the basis of their forest use capability ratings and described in terms of site condition, proportionate production, and degree of effort classes. Various levels of intensity of management for these forest lands were subsequently outlined in the Glackmeyer report. In the forestry plan seven classes of forest properties were considered, based upon: (1) the relative length of time each class could be managed for forest production, (2) the function of the class of forest property and (3) the productivity and size of the class of forest property.

In 1953 Brown¹¹ reported on the application of some of Hills' concepts, somewhat modified for his purposes. Following along similar lines, Bedell *et al*¹² published a report on the results of a study of jack pine yields in Forest Section B7 of the Boreal Forest in northern Quebec. A total of 16 yield site types (abstract groups of physiographic sites) were set up and their relationships to the physiographic features were shown in diagrammatic form. Nine landtypes were recognized and described for mapping purposes.

The landtype unit, as used by these authors, consisted of simple or complex patterns of physiographic sites and associated vegetation occurring across a landscape. A particular landtype was usually composed of one or more occurrences of a specific landform or, in some cases, repeated occurrences of patterns of several landforms.

Landtype mapping, according to these writers, should be the first stage in a program of site typing an area in detail for forest management purposes. It was recommended that initially the most productive and most accessible landtypes should be mapped by detailed physiographic sites to provide "a firm base on which to build knowledge of future yield, carry out silvicultural studies and subsequent treatments for desired reproduction."

Some of the studies in forest site and land classification recently initiated by the writer and other research officers of the Department of Forestry in Canada are designed to illustrate approaches in which land-based, relatively homogeneous units of interacting vegetation and soil are the objects of study. An attempt is made to recognize and map areas of distinctive environments; for most purposes these are defined in terms of certain observable characteristics of vegetation, soil, and terrain, which are abstracted from the environmental complex to provide a framework of reference. This approach serves to identify specific recurring combinations of factors in a given area, the final product being an integrated picture of the distribution and local importance of environments rather than classes of vegetation, soil, topography, and/or climate.

Since relatively large areas are being studied, and since vegetation and soil patterns are being tied to readily observable features of the land surface, aerial photographs and airphoto interpretation techniques are used extensively. These have proved to be valuable technical aids in the application and demonstration of the classification principles being tested.

Within a regional framework the soil, terrain and vegetation components of a given area are treated and classified within a hierarchy of forestland (system) units; these are (in order of decreasing size and generalization) landscapes, landtypes, landtype elements and forest ecosystems. A parallel set of "terrain or geomorphological" terms that are often used are terrain pattern, terrain unit (landform pattern), landform and physiographic site type. The forest vegetation component is similarly arranged in classes ranging from broad forest patterns to forest sub-types.

¹¹ W. G. E. Brown, "Site Classification," *Pulp and Paper Magazine of Canada*, June 1953.

¹² G. H. D. Bedell, W. G. E. Brown and D. W. MacLean, *Forest Site Classification and Growth of Jack Pine Cover Types in Forest Section B 7* (Quebec), Canada, Department of Resources and Development, Forestry Branch, Ottawa, S and M series 53-2, 1953.

Investigations of the forest land resources in a given study area usually begin with the classification and delineation of landtypes (vegetation-terrain patterns). Landtype boundaries are drawn along major breaks in (1) the pattern of soil materials and underlying bedrock types (landform patterns), and/or (2) associated patterns of vegetative cover. These landtypes outline *what* can be found in each area but they do not indicate the exact geographic location of each of the variety of forest ecosystem units that could be present in each area. Each landtype is, however, described in terms of: (1) the kinds of forest ecosystems present within its boundaries, (2) the proportions in which these basic units occur within the land type, and (3) the distribution pattern of these forest ecosystems.

The number and size of these basic vegetation-soil-terrain (forest ecosystem) units that are recognized in each area are governed by purpose and the nature of the problems to which the classification will be applied. The units will be few in number if a broad inventory of forest land resources is all that is required but they may be numerous if detailed research investigations are planned in the study area.

Once the data on physical land characteristics of a specific area are obtained the next phase of the program, dealing with the assessment of productivity and management problems within soil-vegetation units or patterns of units, can be begun. For example, harvesting methods and silvicultural treatments can be planned and tested within this forest land framework which shows the geographic location, composition and structure of various forest stands, the proportions in which they occur within a given area, the kinds of land they grow on, the potential or actual productivity of these vegetation-terrain systems, and so on. Re-

generation difficulties can also be assessed using available information on density of forest and minor vegetation cover, texture and stoniness of surface soil and topographic characteristics in the specific forest ecosystems under consideration.

The system of classification described above, although basically a classification of physical features of forests and forest lands, can serve as a practical and valuable starting point in the assessment of the capabilities of a specific land area to produce forest crops.

Summary

Several land classification systems or parts thereof, and their application to the evaluation of land resources for agricultural and forestry uses, have been reviewed in this article. Landtype or land system units of classification have been highlighted throughout to emphasize some of the concepts that can be (and have been) applied in developing physical land frameworks which can be used as a basis for regional land use planning and assessment.

It is the opinion of the writer that a more reasonable picture of the patterns and importance of various kinds of land over relatively large areas can be obtained if landtype units, instead of being identified as the summation of several individual aspects of land from place to place, are studied and treated as integrated bodies or physical systems of interacting vegetation, soil, climate and land. These units can then be characterized and defined in terms of what appear to be significant, recordable features of the various components of land.

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The Replacement Cost Concept

THE TENDENCY to use interchangeably the terms "replacement cost" and "cost" to designate or define one of the three accepted approaches to property valuation has led to confusion in appraisal literature. Appraisal writers generally link the replacement cost approach with the cost theory of value of the classical economists.¹ Note the nuance of difference in these two definitions of the cost (replacement cost) approach. First, E. Holland Johnson states: "The cost theory assumes that the present value of the subject property is what it would cost to *replace* it new by labor or materials or both—the expense of replacement. . . ."² (Italics added.) Nine years later John R. White set forth this definition: "The advocates of the cost approach to real estate valuation claim that the cost of the good determines its value. . . . Reminiscent of the theories of value originally advocated by Adam Smith, David Ricardo, and John Stuart Mill in the 18th and 19th centuries, it has been held that the value of any good is governed by its costs of production. . . ."³

Appraisal writers have frequently failed to distinguish between the *cost* of an item and the cost to *replace* an item. The supposed synonymy of the terms "cost" and "replacement cost" has caused a failure to emphasize that replacement cost as used to describe a valuation technique is really a conceptual⁴ selling price method. Also, the equating of the two words has resulted in attacks upon the cost (replacement cost) approach because of an alleged theoretical relationship between this method as currently employed and the classical economists' cost of production theory of value.

¹ See Paul F. Wendt, *Real Estate Appraisal* (New York, New York: Henry Holt and Company, 1956), pp. 212-213.

² E. Holland Johnson, "Cost Data in Appraising," *Appraisal Journal*, July 1941, p. 240.

³ John R. White, "Relationship of Real Estate Cost and Value," *Appraisal Journal*, April 1950, p. 244. In all fairness to White, he does differentiate between replacement cost and cost (pages 243-244) but then laps into the fallacy of using the two terms more or less interchangeably while criticizing the cost theory of value.

⁴ The reason for the use of the term "conceptual" will be explained subsequently.

Replacement Cost is a Selling Price

In everyday speech the terms *cost* and *replacement cost* may have different meanings depending upon the context in which the terms are used. The statement by a consumer that a wrist watch *cost* fifty dollars is no different than saying that the watch *sold* for fifty dollars. However, in economics and accounting this loose usage is incorrect. *Cost* refers to the sum of the actual and/or imputed *outlay by the seller* to produce a good. *Selling price* is the *expenditure* by a buyer. As used in appraisal terminology, *replacement cost* *new* represents the selling price of a conceptual "duplicate"⁵ asset. The replacement cost of a new automobile is the selling price, not the production cost, of a "duplicate" of the car. As will be discussed in a subsequent section the problem becomes more complicated for a building, but the fact remains that the replacement cost of the structure is not the actual cash outlay expended in the construction of the building but a conceptual selling price.

Replacement Cost Is An Instantaneous Concept

White's assertion in his analysis of value and cost shows the confused nature of the interpretation of the cost (replacement cost) approach:

. . . the chief deterrent to complete acceptance of the cost theory of value is its presumption of perfect competition. Actually, under prevalent competitive conditions in the real estate economy, there may be vast difference between value and production costs, chiefly, because of the long period of time consumed in the production of building.⁶ (Italics added.) In terms of general micro-economic analysis the observation

⁵ The author has no desire to debate the possible difference between replacement and reproduction cost. Hence, the term "duplicate" may be construed to mean either an exact replica of an asset or a substitute for the services produced by the asset.

⁶ White, *op. cit.*, p. 245.

above is correct since the lag time necessary to complete a building tends to negate the possibility of price being equal to cost at the lowest point in the long-run average cost curve in a model of pure competition. However, despite the generic validity of the statement, it is not specifically germane to a consideration of the cost (replacement cost) approach alone. While the physical factor of building does complicate real estate analysis, it really has no more bearing upon the replacement cost method than the other two approaches. The replacement cost of a building taking one year to construct is not the actual cash outlay incurred during the year but is the conceptual cost of construction for a twin building completely disregarding the time factor.

For example, in the situation of a new building finished after a year's physical completion time, the summation of the total cash outlays made during the one-year period (the contractor's selling price to the buyer) will be equal to the appraiser's estimate of replacement cost new of an exact replica of that building only in the unusual circumstance of completely stable economic conditions. An appraisal of a building to determine the replacement cost (just as with the capitalization and market approaches) is made at a given moment in time and for use at that point in time. The appropriate material and labor prices for the determination of the replacement cost new of a structure are those prices existing at the date of the appraisal. Hence the appraisal's estimate of the replacement cost of a just completed building is neither the contractual selling price to the buyer (unless completely stable economic conditions prevail) nor the cost to the contractor.

Thus, in the example above of a building requiring one year to construct, let us assume that it was begun on a day (\times) during a period of economic prosperity. At the completion date ($\times + 365$), a recession has just set in. The price paid to the contractor (the acquisition cost to the buyer) at $\times + 365$ is \$200,000. If an appraiser is asked on $\times + 365$ to estimate the value of the building by means of the replacement cost approach, he could not use the acquisition cost (\$200,000) as representative of the value of the building. Instead, he would gather together the prices of the labor and

material to be used to duplicate the productive services of the building. Since the appraisal is made at some point in time, the appraiser would use the current prices prevailing at that point in time. He would not attempt to predict the future prices that might exist in the period $\times + 365$ to $\times + 730$. Hence, the replacement cost of the building is the conceptual cost (based on the prevailing price of labor and material) of a duplicate building determined without regard to the time factor.⁷

The Cost of Production Theory of Value

Criticism of the present day cost (replacement cost) approach based upon a theoretical linking of that period with the classical economists cost of production theory of value is sterile. In its simplest form the cost of production theory of value adhered to the principle that labor and capital outlays alone determined the selling price of a good. In all fairness it must be observed that classical value theory was a long-run approach; however, the charge by the marginalists that the classical economists did not consider demand in calculating value was correct. Let us touch briefly upon the issues of the controversy between the classical economists and the marginalists to see why they are not especially germane to an analysis of the replacement cost approach.

Paul Douglas wrote of Adam Smith's rejection of utility and acceptance of cost of production as the sole determinant of value:

"Smith's failure to consider the relative scarcity of commodities in connection with respective utilities is all the more striking in view of the very clear approaches to the point of view made by Locke and Harris . . . By failing to follow up the hints which these writers had developed, Smith helped

⁷ To disregard the time factor may sound a bit strange to those with a background in economics. The author is saying simply that the appraiser takes the current prices of labor and material as the prices to be used in making his value estimate. Even though the building will take a year to construct, the appraiser does not attempt to predict prices for that year. He, in effect, disregards the problem of time.

to divert the writers of the English Classical School into a cul-de-sac from which they did not emerge, in so far as their value theory was concerned, for nearly a century. . . ."⁸

William Jevons, the great English marginalist, stated in the 1870's:

*"The fact is that labour once spent has no influence upon the future value of an article: it is gone and lost forever. In commerce by-gones are forever by-gones; and we are standing clear at each moment, judging the values of things with a view to future utility."*⁹

Jevons was pointing out that the expenditure of labor (and materials) does not automatically mean that the good produced will have a value equal to that outlay. In terms of the example of the building cited previously, the sum of the expenditures for the year period of construction may not be the value of the building. These costs are, in effect, lost and gone forever.

Yet, these sunk costs are no more applicable to the replacement cost approach than to the income capitalization and market-comparison methods. The appraiser using the replacement cost method is standing free and clear of past costs just as is the appraiser employing the other two approaches. The tracing of the great controversy that developed in the 1870's over the failure of the Classical School to consider demand is an excellent device for teaching

economic history or tracing a metamorphosis of valuation theory, but its study today is no more appropriate for an understanding of the present cost (replacement cost) method than a rehashing of the Malthusian doctrine or Jevons' Sun Spot theory of the business cycle.

Conclusions

The purpose of this paper has been to clear up certain theoretical misconceptions surrounding the cost (replacement cost) approach.¹⁰ The replacement cost of a building is a hypothetical selling price which renders any analogy between the cost of production theory of value of the classical economists and this method completely sterile. The replacement cost of a structure is the instantaneous estimate of the cost to build a structure made at some point in time. An equal value for the estimate of conceptual replacement cost of a new building and the actual outlay made to construct that building would be a pure coincidence. Hence, the appraiser is no more hindered by the physical building time lag in applying the cost (replacement cost) approach than in using either of the other two valuation methods.

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⁸ Paul H. Douglas, "Smith's Theory of Value and Distribution," *Adam Smith 1776-1926* (Chicago, Illinois: The University of Chicago Press, 1928), pp. 79-80. The quotations of Locke and Harris are given on page 79 of the cited work.

⁹ William Stanley Jevons, *The Theory of Political Economy* (2nd ed.; London, England: Macmillan and Co., 1879), pp. 176-179.

¹⁰ The author has not attempted to advocate the use of the replacement cost method in preference to the other two approaches nor to consider the practical problems involved in applying the replacement cost method to older buildings. Also, he has made the implicit assumption throughout the entire paper that any building discussed was worth replacing. He has abstracted from most of the problems surrounding the replacement cost method for the simple reason that the sole purpose of the comment is to correct a single conceptual fallacy that the author believes is misleading in appraisal literature.

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Book Reviews

The City in History. Its Origins, its Transformations, and its Prospects. By Lewis Mumford. New York, New York: Harcourt, Brace & World, Inc. 1961, pp. 657. \$11.00.

This is Mumford's twentieth book, published after four years of study, thought and travel—and almost a quarter-century after *The Culture of Cities*. Nearly twenty years ago he thought that he had said his say about the city and turned to the great themes of the condition of man and the conduct of life. But he could not be a closet philosopher. The threats of war and destruction have evoked clarion calls from him: *Men Must Act* (1939), *In the Name of Sanity* (1954).

Now in his sixty fifth year he seeks to weave the many threads of his thought into one tapestry, to find, if he can, some unifying concepts by which we can comprehend the past so as better to guide the future of the city. This is an ambitious undertaking. Mumford is one of the few who would dare the attempt. A fifty-five page bibliography attests the breadth of his own reading, so wide that it can hardly be a guide to most students.

As one would expect, the book is magisterial, written in the grand style. There are sixty-four plates, each of which has a caption of half a page or more, and these are integral parts of the text.

Mumford has struggled in this crowning work to trace back to pre-history the origins of the city. The archeologist provides distressingly inadequate scientific findings so that Mumford resorts "necessarily" to "a mythic extrapolation from the known facts." He disarms the reader by warning him that he may be "dragged down into a bottomless bog of speculation: . . . he proceeds at his own risk."

In his search for understanding Mumford uses many analytic tools: Geddes' "valley section" (though he has divorced the social and anti-social types from their locus in Geddes' diagram); Wittfogel's "hydraulic civilization"; Freudian concepts (the rounded forms of village huts embodying

the female role of container, the rectangular city plan showing the abstract male force; the narcissism of Athens); Jungian concepts ("outpourings from the collective unconscious").

Mumford's thesis is that "throughout the greater part of history, enslavement, forced labor, and destruction have accompanied . . . the growth of urban civilization." "The peripheral successes of urban culture bolstered up its central failure—its commitment to war as the elixir of sovereign power." "The urban institution of war" is "an infantile trauma."

Without going outside Mumford's own evidence, one could draw different conclusions: that the acceptance of the leadership of king and priest led both to an urban society and to institutionalized violence. Indeed Mumford refers to shrines that remained outside cities—in Egypt, Crete, Greece, medieval France. Similarly, medieval Europe had its many "citadels" without a city at their foot.

The important point about Mumford's interpretation of history is its meaning for the future. By this analysis our metropolitan megalopolises are destined to become necropolises (in Geddes' phrase). If cities indeed cause war, changing the form of the city to favor other life values may be the means of ending war. But if cities themselves are the consequences of other forces—kingship, priesthood, and latterly capitalism—it is not so clear that changes in the form of cities will end the destructive forces.

Mumford's intellectual integrity is such that he recognizes that "ironically—yet consolingly—cities have repeatedly outlived the military empires that seemingly destroyed them forever"—Damascus, Baghdad, Jerusalem, Athens still stand. He pays tribute to the immense gathering together of resources for the rebuilding of European cities after World War II: "an energetic effort to achieve a fresh form for the urban core." And he notes that war flourishes, alas, in a world in which four-fifths of the population still lives in villages.

The triumph of Fifth Century Athens was "not a new type of city, but a new kind

of man"—the free citizen; but Mumford's wanderings in modern Athens, his study of the archeologists' findings, lead him to note the sorry physical framework for this unique efflorescence—no coherent street system, no sanitary facilities, indifferent housing.

If Mumford engages in amateur psychologizing, he must allow a reader the same privilege. This magistral book, I affirm, is the expression of a forty-five-year love affair between Lewis Mumford and the City. And, as in every love affair, there are the two faces of attraction and revulsion, of love and hate. "From the beginning, then, the city exhibited an ambivalent character it has never wholly lost." "The city had both a despotic and a divine aspect." "Law and Urban Order," "Monopoly of Creativity," are section titles in which Mumford hymns his affection: "The city itself thus became a collective expression of love." "The Urban Drama" is vulgar and sordid on p. 117, it is glorious on p. 178.

Moreover, the city presents many aspects to its lover. "It is a structure specially equipped to store and transmit the goods of civilization, sufficiently condensed to afford the maximum amount of facilities in a minimum space, but also capable of structural enlargement." (p. 30) But the city is not merely the densely occupied area within a limiting wall—that is a mere accident of the technology of war. "The ability to transform in symbolic forms and human patterns a representative portion of a culture is the great mark of the city." (p. 93) The urban functions are "mobilization, mixture and magnification." The city is the locus of the accumulation of capital. "Perhaps the best definition of the city in its higher aspects is . . . that it is a place designed to offer the widest facilities for significant conversation." (p. 116) In the urban marketplace the exchange of ideas is as significant as the interchange of goods (until the advent of the supermarket!).

Whereas Toynbee sees the secular process as the transformation from "material" to "ethereal," Mumford sees the rhythm of life in cities as an alternation between materialization and etherealization: "both stability and constant creativity are needed and that combination was the supreme gift of the city."

The reader will find what he expects from Mumford, vivid and trenchant characterizations en passant of this or that specimen of planning or architecture. His comment on Giedion in his bibliography is "brilliant, but often cavalier in presenting facts and judgments." There might be some readers who would similarly characterize some of Mumford's judgments but they are always provocative.

"The further prospects" of the city "are difficult to weigh." In his concluding sections, "The Cultural Function of the World City" and "The Invisible City," he pleads for "the development of a more organic world picture, which shall do justice to all the dimensions of living organisms and human personalities"—if we can stave off total destruction. Every urbanist will want to give thoughtful study to this all-encompassing masterly book.

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Industrial Estates: Tool for Industrialization. By William Bredo. Glencoe, Illinois: Free Press, 1960, pp. 240. \$6.00.

An industrial estate is a tract of land which is subdivided and developed according to a comprehensive plan for the use of a community of industrial enterprisers. Industrial parks can be used for modification of the locational and technological patterns of entire industries: specific companies can be enticed to come to communities that desire to industrialize so as to create more employment and expand tax revenue to pay for improved community services. Within the overall framework of metropolitan areas planning suburban industrial estates can help to alleviate congestion in the downtown core of the large cities. They can aid in systematic expansion and diversification of the industrial base of chronically depressed regions and can therefore be helpful in industrialization of underdeveloped countries.

Small enterprises stand to gain most from locating in an Industrial Estates. This is because the experienced real estate operator can find appropriate locations for industrial parks, assemble and develop the land, lay out and build the facilities, put in all utili-

ties (access roads, water, electricity, sewage disposal), negotiate tax agreements, provide service facilities and "mobilize" financing for buildings and equipment, and sell the whole "package" to a small entrepreneur at less cost than the individual would have to pay if he were to do it himself.

Dr. Breido readily admits that improperly planned and executed industrial parks can be detrimental to the tenants, investors as well as the communities. He cites several near-disastrous how-not-to-do-it examples. These clearly show that industrial estates are not a panacea for the evils of uncoordinated urban sprawl, or automatic gimmicks that would move underdeveloped economies off dead center of stagnation and launch them into the orbit of affluence. On the contrary, industrial estates are only one cog in a well-planned development wheel which consists of many interdependent institutional devices: industrial extension, advisory and research services; demonstration and development centers; purchasing, manufacturing and marketing cooperatives; trade associations; training programs for management and labor; and financial support facilities.

This excellent book is already becoming a standard reference for land use development planners here and abroad. That fact alone is sufficient praise for Dr. Breido's valuable contribution.

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Western Forest Industry—An Economic Outlook. By John A. Guthrie and George R. Armstrong. Washington, D. C.: Resources for the Future, Inc., 1961, pp. 324. \$6.50.

Any study of the forest situation and outlook is bound to receive wide attention, and to stir up controversies concerning its economic projections, interpretations, and policy implications. This study should prove to be no exception. The forest industries examined include lumber, pulp and paper, and plywood and veneer. Prospective development of these industries is analyzed through the year 1975.

A key concept of this book is that the eleven western states, plus British Columbia and Alaska, form an economic unit with similar or complementary physical and economic characteristics and that this unit is developing differently from other regions. Many readers have undoubtedly been dissatisfied with the limitations of most previous studies, either restricted to smaller regions which took no account of regional interactions and dependencies, or which obscured regional identity by looking only at the national picture as a whole. The broad regional outlook presented in this book provides a refreshing new frame of reference for analysis and understanding of economic forces and processes which control development of the forest industries and their relation to the regional economy. As the nation grows it will demand more timber products and all of the western regions should be considered together in examining the problems of where the necessary raw material should be produced, and of how the forest-industry structure might logically develop for its manufacturers.

Some readers will be uneasy over the use of visual extrapolation in projecting future trends. Although the authors present several reasons for employing this method, still this reviewer accepts only with a good deal of reservation the course of some of the projections.

The authors conclude that the western forest industries have a potential future that is reassuringly bright, provided that more public timber is put on the market. This is based on a trend toward sustained-yield on industrial forest lands, a backlog of publicly-owned timber supply, and an anticipated increase in demand for most forest products. However, the authors add that there will undoubtedly be problems of adjustment, some dislocation of existing industry, and some depletion of the resource in some ownerships and some sections. They expect an accelerated process of adjustment to demand and supply factors. The growing national population and gross national product will bring upward pressure on lumber prices which is expected to accelerate the trend toward substitution of other materials in construction and other uses. On the other hand, these same

pressures in the pulp and paper industry and in the plywood industry, are expected to bring about an adjustment which will increase the supply, allowing per capita consumption to continue its long-established upward trend.

Additional integration of these three industries, together with manufacture of hardboard and particle board, will minimize the effect of such changes on the individual industries. Interior forests are generally less well developed than those of the coastal areas, and growth of the forest-products industries is therefore expected to be more rapid in the interior, with some of this growth representing relocation or regional expansion of coastal firms. Noting the volume of residues produced, the authors hope for major innovations in the technology of lumber manufacture and in the development of a silva-chemical industry in the future.

Ability of western forest industries to market their sawtimber products successfully in competition from other areas or from substitute products is seen to be conditioned more by patterns of timber ownership and owner policies than by costs of processing and marketing.

The study examines the problem of cut and growth and foresees a serious depletion of privately-owned timber stands by 1975. Somehow, the authors suggest, there must be more public timber made available to reduce pressure for heavier cutting of private timber and its unnecessary depletion. Implicit in the study's 1975 projections of output is an assumption that some modification of the government's timber sales program will occur within the next fifteen years. This apparently means dovetailing the allowable cut of public forests with that of private forests; and the book hints that rigid contractual arrangements for such dovetailing may not be necessary as many foresters have assumed.

Here follows a discussion of sustained yield, allowable cut, and speed of the transition to a more fully regulated forest under sustained yield. Five alternative criteria are offered as a basis for determining the allowable cut on public forests: (1) even flow over a rotation long enough to grow trees to the size demanded by future users, (2) maintenance of stable timber prices, (3)

equalization of regional prices between competing areas, (4) cutting so as to maintain approximately the present ratio of private to public timber holdings, and (5) political pressure.

The first of these criteria is offered as probably the best, modified by some control over the business cycle and over the long run, as guided by the second and third criteria. Perhaps it would have been clearer to say that allowable cuts are determined primarily by timber supply and timber productivity and that actual cuts should be made flexible in response to demand as reflected by price trends.

The subject of sustained yield and allowable cut is of great interest, but this book's coverage seems inadequate. To begin with, the definition given for sustained yield covers only the situation where a given forest can support a stable manufacturing plant, or plants, in perpetuity. In most traditional definitions this tie-in with industry is not necessary. Second, the criteria offered for determining allowable cut do not make clear the strong influence of rotation length on the allowable cut. Moreover, there is a growing controversy among foresters over whether the nation's interests are best served by a rotation based on culmination of mean annual increment or by some economic rotation which takes into account the rate of return on growing stock as compared to rate of return from other potential investments or expenditures. The book might have noted that in practice the term *allowable cut* generally refers only to the regulated harvest cut of mature trees, and that more and more of the actual cut each year comes from thinnings, relogging, or salvage or mortality. Great importance is given by both industry and government foresters to this supplemental cut as a means to tide the Douglas-fir region, for example, over any hiatus between old growth and young growth, and to prevent any serious reduction in total output.

Some principles are presented concerning the proper speed of the transition to younger, managed forests, and different viewpoints of industry and the public agencies are noted. Briefly, the public agencies fear that a larger annual cut on public forests now, with substantial reductions later, is incompatible with the goal of community

stability, while industry feels that communities may face instability *unless* the public cut is greatly increased as private timber cuts become reduced.

Speed of the transition period, of course, has a great deal to do with allowable cut, and a great deal more needs to be said concerning the size of any prospective reduction in a given area's output under an accelerated program and its potential effect, good or bad, on community development.

As a closing observation, this book seems to have more inaccuracies of style or statement than should be expected, or challenging statements with which the reader might take issue. For example: "Douglas-fir pole-timber is not of great importance" (p. 27);

the thought that Bureau of Land Management and Forest Service land is available for sale (pp. 38, 39); "... [on public lands] there is little variation in the manner of timber disposal" (p. 42); and "these [four Alaska pulp sales] were negotiated rather than competitive bid sales" (p. 42). In addition, it is not clear whether the United States Forest Service source given for Figures 30 and 31 is meant to be for past production, future projections, or both (p. 170, 172). The text appears to give nearly all projections as the authors'.

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Selected Contents

Shape of the Third Plan

Objectives and Targets, Resources and Outlay,
On the Agricultural Front, The Programme for Industries

Aspects of the Plan

Growth of the Indian Economy during the Third Plan	Uma Datta
The Draft Third Five-Year Plan	R. M. Goodwin
An Approach to Indian Planning	D. R. Gadgil
Industrial Capacity and Utilisation	Jagdish Bhagwati
Wage Movements Since Independence	B. N. Datar
Export Strategy for the Next Decade	Surendra Patel

Other Articles

Central Government's Capital Expenditure 1950-51 to 1961-62.....	I. S. Gulati
Money, Banking and Monetary Control	M. V. Posner
The Cuban Revolution: Some Whys and Wherefores	Andrew Gunder Frank
Bye-Products of the Census of 1961	Asok Mitra
Indian Cities	Bert F. Hoselitz
Chamar Family in a North Indian Village	Bernard S. Cohn

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